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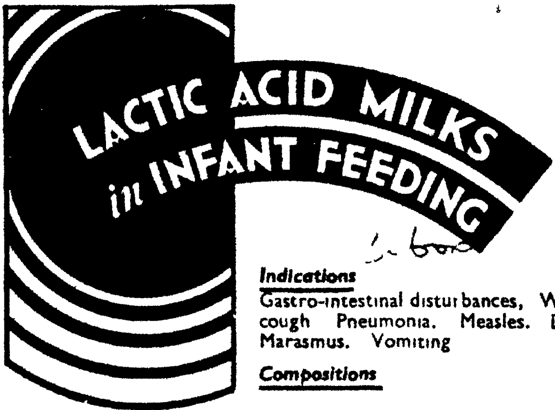

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THE PRACTITIONER

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ENDOCRINES AND MENTAL DISORDERS

By Sir W. LANGDON-BROWN, M.A., M.D., F.R.C.P.

Emeritus Professor of Physic, University of Cambridge; Consulting Physician, St. Bartholomew's Hospital.

IT is no paradox to say that the rapid increase in knowledge of the endocrine system during the last decade has replaced robust dogmatism by a more cautious attitude. Particularly is this true in the sphere of character and mental attributes. Nor are the reasons for this hard to find. When Starling in 1905 put forward his theory of hormones and the chemical regulation of the body, his views were extended by others in such a way as apparently to render the influence of the nervous system negligible. But gradually it became realized that the endocrine glands were not exempt from nervous control, and then came the recognition of the role of the diencephalon in the expression of the emotions. The next advance was the establishment of the position of the pituitary as the intermediary between this emotional centre and the other endocrine glands. That emotions could influence secretion had long been realized; the tears of grief, the dry mouth of fear, the disturbed digestion of anxiety are proverbial. It was more slowly realized that such facts were merely special cases of a general rule elucidated by Dale and expressed by Hopkins in the saying that all nervous stimuli evoke a chemical substance which translates for the tissues the messages received from the nerves. It thus became clear that not only could the endocrine make-up influence the emotional state but that the emotions could influence the endocrines. It is therefore necessary to be careful in assessing the value of the evidence of an association between the psychoses and endocrine dysfunction. Certainly the literature of such an association is not prolific. Notkin[1] found only eight instances in a State Hospital population of 6,000: three of these were mental defectives, two of whom showed pluriglandular syndromes, the other being a cretin. There were three schizophrenics, but there was no correspondence between their mental and their endocrine states, for one of these was a eunuchoid, one a case of Fröhlich's syndrome, while the third showed a mixture of hyperthyroidism and hypo-adrenalism. There was one manic-depressive who had a pathological adiposity, but no one would venture to associate this all too common psychosis with obesity. Indeed, with two such common conditions, it is rather surprising that the coincidence is not more frequent. Cæsar's preference for stout men in his entourage thus receives psychiatric sanction. The remaining case, one of epileptic deterioration, showed hypo-ovarian stigmata. This is not an impressive list, and seems to indicate that the relationship between endocrine dysfunction and mental disorders has been over-rated, especially in view of the frequent occurrence of endocrine dysfunction without psychosis.

Endocrine dysfunction may of course contribute towards a psychosis in various indirect ways. Thus when an endocrinopathy leads to personal disfigurement, it may powerfully induce a sense of inferiority which may completely upset the balance of an unstable personality. The mental effects of castration are well known to be profound. On the other hand, it is clear that congenital mental defects or psychoses occurring early in life are likely to lead to failure of development in endocrine as in other directions. The closeness of the ties between the endocrines and the nervous system is illustrated by the failure of the adrenals to develop in anencephalic monsters.

FUNDAMENTAL QUESTIONS

Hoskins and Sleeper[2] pose three questions.

> (1) Is there a significantly high incidence among schizophrenics of the morphological stigmata of endocrine abnormalities?

This has already been answered in the negative. It is true that about one-third of psychotic patients show bodily abnormalities, especially in the field of sex (Wertham) and that there is a high incidence of the thymolymphatic type (Timme). But that is not quite the same thing as evidence of definite endocrine disorders.

> (2) Are the physiological and metabolic functions distorted as they are in endocrine disorders?

The basal metabolic rate is often lowered by more than 10 per cent. in schizophrenics, and the blood-sugar curve is not infrequently abnormal in various psychoses. It will be recalled, however, that the blood-sugar curve is frequently found to be disturbed in lethargic encephalitis, which has a predilection for attacking the mid-brain and profoundly modifies behaviour. Yet no one would call lethargic encephalitis an endocrine disease. Indeed Hoskins and Sleeper are obliged to admit that such alterations as they observed in physiological and metabolic functions might be accounted for in part at least by chronic emotional disturbances.

> (3) Do the endocrine glands of the psychotic show characteristic pathological changes?

They claim to have found a high incidence of structural defects in the endocrine glands in cases of schizophrenia and to a less extent in other psychoses. They quote Cushing to the effect that he did not find a single normal pituitary gland in a series of 70 postmortems on psychotics, the changes being generally degenerative in schizophrenics. But the existing evidence fails to prove whether these are characteristic of the psychoses as such or incidental. The evidence therefore of a causal connection between endocrine disorders in the psychoses is not impressive, though doubtless the psychoses are influenced in a number of ways by the endocrine status of the subjects. Conversely a long-continued psychosis may influence the endocrine glands as well as other physical structures.

With these cautions in mind it is now possible to consider some instances in which endocrine disorders seem to have led to definite psychoses or psychoneuroses. Whether these two mental alterations are connected or are quite distinct appears to be matters of some controversy among psychiatrists. Fortunately that question need not arise in the present discussion.

THE THYROID

There is no doubt that a direct connection between glandular dysfunction and mental disturbances is clearer in the case of the thyroid than with any other gland.

The necessity for thyroxine in the due maintenance of mental activity is well recognized. It has been one of the triumphs of thyroid medication that it has rescued many from mental hebetude, or worse, to a life of normal mental activity. The *cretin* is dwarfed in body and mind, but is curiously placid and adaptable, just as the sufferer from an excess of thyroid is irritable and intransigent.

Myxœdema.—The adult sufferer from thyroid defect is more likely to be conscious of failing powers, and is therefore apt to be morose and suspicious, referring internal difficulties to external causes, as everyone is apt to do. More usually the mental attitude is one of resigned melancholy. Sometimes there are hallucinations of sight and hearing. But the patient with myxœdema may occasionally become acutely maniacal.

On several occasions I saw a patient with myxœdema who improved very much on thyroid treatment. Then I lost sight of him, and I thought that, as he had now found the appropriate dose of thyroid extract, he was treating himself. But I found later that he had abandoned medical treatment to take up Christian Science. Perhaps this was the first sign of impaired mental balance, but at any rate he became violently maniacal, and was removed to an asylum. Here it was recognized that he was myxœdematous, but in view of his mania they did not venture to give him thyroid. However, as he did not improve at all in three weeks, he was put on thyroid, with immediate benefit. He soon became sane and able to give his medical history, and the superintendent communicated with me. He remained quite sane, dying some years later after an operation for gall-stones. I have heard of other similar cases.

But children and adults whose hypothyroidism falls short of cretinism or myxœdema may also have their mental state greatly improved by thyroid treatment. In daily life people are often encountered whose condition does not amount to actual disease, but proclaims aloud their need for thyroid.

Hyperthyroidism.—Crile says: "I have never known a case of Graves's disease to be caused by success or happiness alone, or by hard physical labour unattended by psychic strain, or to be the result of energy voluntarily discharged." Sufferers from this condition are always irritable, and tend to be explosive. Thoroughly unreasonable, they regard themselves as the only righteous persons in a wicked and froward world. "O cursèd spite, that ever I was born to set it right," is the burden of their lament. It has been pointed out that Shelley had a hyperthyroid face. He certainly represented the hyperthyroidic temperament at its best. Of his creative genius there is no doubt, but in practical matters he beat his wings ineffectually against the bars of his cage. Indeed, his friend Hogg compared him with an albatross—magnificent in flight, but merely grotesque in captivity.

The sufferer from hyperthyroidism always experiences difficulty with her environment, which not only makes her "gey ill to live with," but which may precipitate her into actual insanity, with suicidal tendencies. The thyroid gland is apt to enlarge in nerve storms, and in the manic-depressive psychoses I have seen the excited phase accompanied by signs of an overactive thyroid, to be replaced by signs of underaction as the phase of depression comes on.

It has been well said that the cause of Graves's disease is sex and sepsis. Septic conditions, such as chronically infected tonsils may determine the direction in which the emotional disturbance may find expression, but the emotional cause is generally there, though from its nature, not always easy to elicit. The recognition of a thyrotropic hormone in the anterior pituitary has made this sequence of events more comprehensible, considering the close association between the pituitary and the diencephalon. Indeed, one prominent sign of Graves's disease, the exophthalmos, is now generally attributed to involvement of the upper part of the mid-brain. Hector Mackenzie's description of Graves's disease as a state of continued fear was an illuminating one and nearer the truth than could be realized at the time. For whatever the psychical origin in an individual case, the predominant feeling is one of fear, masked though that fear may be. Much has been heard of late concerning masked thyrotoxicosis as affecting the heart, but it is also true that the mental effects of thyrotoxicosis may greatly outweigh the glandular signs and symptoms.

I will illustrate this by a recent case. A woman who had had a small adenoma in her thyroid for years was nearing the menopause, which in itself would be likely to disturb her endocrine balance, when she had, rightly or wrongly, doubts as to her husband's fidelity. She became mildly hyperthyroidic and it was found she had some oral sepsis. On removal of some septic teeth she flared up into an acute hyperthyroidism in which the mental symptoms predominated. She emaciated and developed glycosuria, but was also acutely maniacal. As her pulse rate seldom exceeded 100, I could hardly believe that her mental state was conditioned by her thyroid, but Dr. R. D. Gillespie was confident that she was suffering from a toxic insanity, and as she appeared likely to die almost immediately if nothing drastic was done, Sir Thomas Dunhill ligatured at first one thyroid artery and then, a week later, two more, and finally performed a partial thyroidectomy. After the first stage of this procedure she was at least 60 per cent. normal mentally, and by the time she had recovered from the final operation she had changed from a resistive, obscene, incontinent, raving lunatic to a charming, courteous, sane lady.

The vicious circle is here clearly seen; an old quiescent thyroid lesion, emotional strain and a septic focus, flaring up of the thyroid into a toxic adenoma, and then sheer frank insanity, which rapidly subsided on reducing the amount of thyroxine which was being poured into the circulation.

THE PITUITARY

It is curious that many of the psychological accompaniments of pituitary disorder are similar whether associated with excess or with defect of pituitary activity. It is really possible to speak only of the psychological accompaniments of *dyspituitarism.* Sufferers from a minor degree of hypopituitarism may attempt to compensate for it by persistent conscientious effort, often in excess of their physical strength. But both the pituitary giant and the Fröhlich tend to lack inhibitions. They may lie, steal, set fire to things and commit other offences in a foolish, pointless way; often it would seem, merely to attract attention. Shoplifting is not uncommon, and I have had a number of cases of repeated thieving at school under conditions in which detection was inevitable.

One girl stole a gold watch from a schoolfellow, and on her return home for the holidays told her mother it had been given her as a prize for good conduct!

Not infrequently the thefts are to provide funds to "show off" by giving presents or other means of attracting popularity. For they try in many ways to compensate for their feeling of inferiority by a craving for the limelight, and if they cannot achieve this with their social equals they seek it from their social inferiors. They are prone to fantasy thinking, like many psychoneurotics without pituitary disease, seeking a dream world in which to escape from this feeling of inferiority. Fantasies of pregnancy are not uncommon.

Attention should be drawn to the occasional alternation of mental and endocrine symptoms:

Thus, in one case of manic-depressive psychosis I saw in a young man of 19, during the phase of excitement there was loss of weight and meddlesome religiosity, while during the intervals of apparently normal and very pleasant mentality, all the physical signs of hypopituitarism appeared.

Alternations of confusional insanity and glycosuria have been reported, which are more intelligible now that Houssay has shown the existence of a diabetogenic principle in the anterior pituitary. Adie[3] called attention to the very different mental effects of pituitary tumours according to their position. Those which spring from Rathke's pouch, the congenital craniopharyngiomas, are slowly progressive, and the emotional state is one of indifference and negativism. Those which invade the diencephalon remove cortical inhibition, leaving the patient in a state quite comparable with the "sham rage" described by Sherrington and others in decorticated animals. But complete obliteration of the diencephalon, by a teratoma, for instance, may wipe out all emotional expression.[4]

THE ADRENALS

The onset of virilism from cortical hyperplasia or neoplasm is naturally very upsetting to the individual who feels in peril of change.

I have recorded[5] an extraordinary case in which a woman became terror-stricken, deploring a mysterious calamity which had fallen upon her. At last she confided to me that she felt as if she were turning into a man. This led me to look for an adrenal tumour, which was found and removed. Her case is of especial interest because the psychological changes were recognizable before the physical. Her terror may have been increased by the concomitant irritation of the adrenal medulla, which would tend to over-stimulate her sympathetic nervous system.

The discovery that in Addison's disease there is a failure to retain sodium salts has been followed up in an interesting manner by McCance,[6] who, with his fellow workers, eliminated all salt from their diet and also from their bodies as much as possible by diuretics and diaphoretics. They reproduced many of the signs and symptoms of Addison's disease in themselves except pigmentation (a slow process) and the low blood-pressure; muscular cramps were marked, as in certain other conditions leading to excessive sweating. But what is germane to the present topic is the mental state produced in two of the subjects of the experiment. They both commented on feeling " slow in the head." They reacted very slowly and apathetically to any suggestions, pleasant or unpleasant, made to them, and their whole mental processes appeared to be dulled. McCance is of opinion that this mental state, resulting from salt deprivation, would well repay investigation. Some thirty years ago the mineral metabolism of " neurasthenics " was studied without any very positive results, but a re-opening of the subject with a more rigid selection of cases and the wider range of technique now available might well be fruitful. The functions of the adrenal cortex are clearly more extensive than we realized—for instance, in connection with lipoid metabolism and the storage of vitamin C. Point is added to this suggestion by Goldberger's discovery that lack of vitamin B_2 is the cause of pellagra, in which dementia is a prominent symptom, and by Edward Mellanby's claim that lack of vitamin A is a factor in producing nerve degeneration. Clearly these minutiæ of metabolism are worthy of further investigation for the interpretation of nervous and mental disorders.

THE PANCREAS

From the endocrine point of view only the cell islets need be considered. No special form of mental disorder can be rightly called diabetic, but there may be a pathological exaggeration of the patient's usual peculiarities of temperament. Since the introduction of insulin, insanity resulting from diabetes seems to have become very rare. This suggests that the misery of the restricted diet and of the unrelieved symptoms played an important part in inducing it. On the other hand, insulin has led to the recognition of hypoglycæmia, in which mental symptoms may range from a vague apprehensiveness to a maniacal excitement, whether resulting from an overdose of the hormone or from a pancreatic adenoma.

In a case reported by the Mayo Clinic, a bricklayer who had gradually found himself compelled to eat some starch or sugar every two hours to combat exhaustion, was once unable to do so. He suddenly "ran amok" with homicidal attempts, and when under restraint, a blood-sugar estimation revealed only 40 mgm. per cent. He was subsequently found to have a pancreatic adenoma.

The recognition of a hypoglycæmic syndrome has naturally led to investigations of the blood sugar of psychotics, but no general conclusions appear to have been reached, though abnormal curves are common; but their interpretation is difficult and open to fallacy. That the subject of low blood-sugar in relation to nervous states is important can be seen from the effect of glucose in functional nervous disease in children (H. C. Cameron), and in certain cases of migraine in adults.

THE PARATHYROIDS

In hypoparathyroidism, in addition to such muscular manifestations as tetany or clonic spasms, there are occasional hallucinatory disturbances (Hoskins and Sleeper). Timme describes such subjects as incorrigible and unamenable to discipline.

THE PINEAL

The classical signs of a pineal tumour are evidences of increased intracranial pressure, ocular disturbances, and premature development of both primary and secondary sexual characteristics. Precocious mental and physical development may occur; thus, Frankl-Hochwart[7] described the case of a boy aged five who discussed philosophy and the immortality of the soul. Others have called attention to the adult, reflective expression which may accompany such mental precocity. Mental feebleness is, however, more common, which may go on to frank insanity with epileptiform convulsions. Whether or not, however, such effects are produced through the endocrine system is doubtful; the experimental evidence as to the action of pineal extracts is contradictory. It seems more probable that the effects of a pineal growth operate directly through the central nervous system. The resemblances between overaction of the adrenal cortex and underaction of the pineal are suggestive in view of the influence of the former in the development of the central nervous system. As the pineal is generally regarded as a retarding structure, prolonging childhood and delaying sexual maturity, the syndrome described above may be regarded as associated with defect rather than with overaction of that structure.

THE GONADS

Many mental defectives are prone to hypogonadism. It is true that in some cases of mongolism puberty develops early. If so, it is generally prognostic of a shortened life cycle. Among the vague endocrine manifestations in dementia præcox, reversed secondary sexual characters and variations in gonadal structure are perhaps the most frequent.

Wagner-Jauregg[8] recognized a pre-psychotic type of personality associated with combined thyroid and ovarian deficiency. This type is likely to develop hebephrenia, but may go through life merely showing a futile personality. Rowe[9] maintained that " an insistently expressed egoism is the keynote of the hypogonad character. Coupled with this is an active resentment towards a world that is but inadequately mindful of the patients' many excellences. Hyper-emotionalism and self-pity are united with an attitude of acrid criticism."

Paul Schiff,[10] reviewing the literature on the effect of sterilization upon the psychic outlook concluded that in the two countries where it is most advocated and practised—America and Germany—the published statements are theoretical and vague, without statistical support, emanating mostly from sociologists and jurists, who champion these methods, rather than from physicians handling the cases. He divided castrations and sterilizations into three groups; the congenital eunuch, who may suffer from envy and no more; the voluntary eunuch, who may acquire a tranquil mind; those who are castrated by force or accident, who suffer cruelly and acquire a peculiar moroseness. The second group who spontaneously demand the operation are unsettled individuals—insane or perverted. Schiff believes that the psychic stigmata of the third group will probably be found in individuals punished by castration under the recent German law.

Very few definitely hypogonadal individuals escape a sense of inferiority, which may develop into a positive psychosis. It would take us too far to discuss the manifold psychoneurotic and psychotic complications of the menopause, but on the endocrine side we may state that there is temporary over-secretion of prolan apparently as an attempt to stimulate the failing ovarian secretion, which leads to a vasomotor instability. This may well be a contributory factor to the emotional and mental instability. It is interesting that both at the menopause and after castration there is an increase in a certain type of cell in the anterior pituitary. The evidence in favour of a male climacteric is quite unsatisfactory, but the effect of an hypertrophied prostate in removing normal sexual inhibitions is only too clearly demonstrated repeatedly in the law courts.

ORGANOTHERAPY

It follows from all that has been said that the outlook for organotherapy is not very promising apart from the thyroid cases. More than twenty years ago Kraepelin stated that he had tried to influence dementia præcox by extracts of every possible organ without any effect. Although more potent endocrine preparations now exist, this remains broadly true to-day for this and other psychoses. Many results have been reported, but the evidence is not conclusive. The spontaneous changes in the manic-depressive psychosis are responsible for many treatments becoming accredited as cures. Some of the most grateful letters I have received from patients are from manic-depressives who happened to come out of the depressed phase soon after some treatment I had suggested. Then came a relapse and gratitude evaporated! It is, of course, advisable to treat any obvious endocrine disturbance in the hope that improvement in the general health may contribute to a cure. It is also worth while to administer thyroid if the reaction time is slow, and the basal metabolic rate is low, even in the absence of any other evidence of hypothyroidism. There is a growing belief in the efficacy of preparations of œstrin in the treatment of climacteric disturbances, but Bishop recommends small rather than large doses.

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CLASSIFICATION AND ETIOLOGY OF THE NEUROSES

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THE common neuroses resemble the common cold in an important respect: they generally have a multiple etiology. In the early days of vaccine-therapy it was usual to isolate a single pathogenic bacterium and to administer the appropriate vaccine. Nowadays it is usual to look for the correct combination of various micro-organisms for success in such treatment. This conception necessitates an analysis of etiological factors rather than a description and classification of the syndrome. It follows, then, that interest in the classification of functional nervous disorders must be limited by this knowledge that a multiple etiology is the rule rather than the exception. It is not uncommon, however, to encounter the conscientious physician who troubles himself unnecessarily over the differential diagnosis between neurasthenia and an anxiety state, as though he were deciding between scarlet fever and measles. The probability is that the case has elements of both conditions. And if that be granted, it follows—and this is of paramount importance—that treatment must be directed, as far as possible, to each etiological factor, and not merely to the major factor. And, in that psychic and physical factors frequently present themselves in the same syndrome, it follows that pure psychotherapy is generally as inadequate as pure physiotherapy.

If the different classifications of functional disorders are examined, notable contradictions and not a little confusion are encountered. This need not cause undue trouble if it is borne in mind that these different classifications have for the most part been elaborated from a single, and often from a narrow, theory of causation. It will therefore be more useful if different terms in current use are examined from a broad etiological basis rather than in the hope of making each coincide with a well-defined syndrome.

NEURASTHENIA

This term was popularized by Weir Mitchell, that prince of empirical therapists. It covered practically all functional nervous disorders. It stood for fatigability as the greatest common measure of the psychoneuroses. It assumed that physical factors dominated the etiology, and it was associated with a routine form of treatment in which physiotherapy was patent while a great deal of psychotherapy remained latent. It will be worth while to examine later the curative factors in Weir Mitchell's treatment. Meantime it is important to note that the term neurasthenia can suitably be used to describe all conditions emanating from prolonged or acute infection in which fatigability, especially of the attentive processes, is a marked feature. It should not be used for cases in which psychogenic factors such as anxiety and hysteria preponderate. Also, it is to be remembered that doctors are always under the temptation of using a popular and fashionable term to the patient and his relatives when they have diagnosed something more precise and less pleasing, such as an early schizophrenia or a frank hysteria.

Traumatic neurasthenia.—Of all functional disturbances this has received the closest attention from surgeons if not also from physicians. Furthermore it is respectfully considered by lawyers, and much litigation has turned on the relation of a given neurasthenic syndrome to a precedent accident. The factor of multiple etiology is rarely recognized. For instance, a man who has suffered for some years from chronic sinusitis may have been able to attend business regularly and may have complained of no more than progressive fatigue. He is knocked over by a car and sustains trivial injuries. A long and intractable neurasthenia follows. For the patient it is claimed that up to the time of the accident he had been able to do his work and had only consulted a doctor for an occasional cold. For the defence it is submitted that the symptoms are out of all proportion to the nature of the injury. It is suggested that hysteria or even malingering is present. The actual fact is that the patient was slowly developing a toxic neurasthenia, when the unimportant trauma resulted in effects proportionate not to the trauma but to the toxæmia.

Anxiety neurasthenia.—This is an important condition because of its prevalence. The conception was Freud's, who first pointed out the effects of stimulation and inhibition of the sexual reflex. The practice of coitus interruptus as a method of birth control is historically as old as the book of Genesis. Chemical and mechanical methods of contraception are fortunately making it unnecessary and unjustifiable. In my experience many individuals are capable of pursuing this practice for many years without detriment. If, however, toxic absorption sets in, the harmful effects begin to manifest themselves at once. It may be said, therefore, that neurasthenia may be attributable to toxic exhaustion, to trauma, or to this particular form of functional exhaustion. When two causes are combined the syndrome occurs in a more pronounced form.

PSYCHASTHENIA

This was the term coined by Janet. It had the advantage over Weir Mitchell's term of referring the centre of disorder to the psyche as opposed to the central nervous system. It dealt primarily with the lowering of the mental threshold; it corresponded to a constitutional etiology, and therefore it was associated with a very vague therapeutic outlook. But, like Weir Mitchell, Janet used the term he had introduced with a very wide denotation. If the term is used at all it should be used to express the factor of constitutional, as opposed to acquired, fatigability.

And in this connection it is well to point out that the psychasthenic may be an individual of rich intellectual and emotional endowment, though he lacks endurance. The Americans have a term " constitutional psychopathic inferior," which in many ways corresponds to a legitimate use of Janet's term. The true psychasthenic invariably presents some physical stigma of degeneracy, as, for example, the highly-arched palate or the ill-shaped cranium.

HYSTERIA

This is the form of functional disorder recognized by the ancients. They knew very well that the condition was associated with the patient's instinctual life. They assumed that it emanated from the female generative organs. Their conception was nearer the truth than the Victorian interpretation which condemned the hysteric as the subject of imaginary symptoms, who consciously contrived to be ill rather than well. In point of fact, the most central feature of hysteria is the exploitation of illness for an emotional end. Whether the end be acknowledged in consciousness, partially or not at all, makes little difference. The hysteric acts the role of martyr or heroine as a means of achieving a goal in relation to society. The hysterical soldier suffers from headaches which he believes he cannot control. The hysterical girl carries on her domestic duties in spite of the backache from which she suffers. Each claims to be the victim of a subjective condition that cannot be objectively confirmed. The one seeks to impress the medical officer or the medical board; the other is determined to impress her father in particular, and perhaps her family in general. The first is exploiting his symptom to prolong his period of security and rest; the other is parading her suffering that she may be regarded as a heroine. In each case the condition is thought to be resultant; the first from shell shock, and the second from a fall. But in each case the condition is purposive and depends on the goal in view. And because hysteria is a purposive neurosis it follows that it has in it a creative element. It is a commonplace that the symptoms of the hysteric are of infinite variety; it is also a commonplace that hysteria is frequently associated with the dramatic temperament, and it has always been recognized as being connected with the generative life. These considerations indicate the conception of hysteria as a creative, dramatic and purposive attempt to command attention, appreciation, sympathy or admiration. At the same time, it must always be borne in mind that the hysteric generally utilizes organic disorder by exaggerating or protracting it, whereas it is usually assumed that because the patient is palpably hysteric the etiology is free from any physical factor. Perhaps the most classical example of this is the early disseminated sclerosis occurring in a hysterical girl. Here the physician is apt to be impressed by the variability of the complaints, the dramatization of the symptoms, and the clear purpose to be served by them. He may consequently be trapped into a confident diagnosis of functional trouble until some time later he is confronted by an unmistakeable nystagmus or an extensor plantar response. The practitioner must rid his mind therefore of the dangerous preconception that hysteria excludes any other etiology. It does not. Hysteria can infiltrate and mask every form of organic and functional disturbance. Therefore the task of the diagnostician is invariably complicated in a way that applies to no other disorder.

Hysteria is a condition wellnigh limited to the extravert class. This is comprehensible if it is remembered that the purpose of the hysterical manifestation is centrifugal, i.e. it is directed from the subject to the object. It will be seen that the contrary is the case with the anxiety states. In hysteria the self-love of the patient is utilizing morbid symptoms to extort from the reluctant herd a valuation she cannot otherwise achieve. It has been said that the neurotic in general is an individual who is trying to bring life to a standstill. It would perhaps be more exact to say that every neurotic is resisting adaptation. The particular method of the hysteric is to achieve some modification of the demands of life. Thus the hysteric who is unimportant, instead of adjusting herself to unimportance, exploits an illness which ensures importance and thus exempts her from accepting unimportance.

THE ANXIETY STATES

If hysteria is regarded as a neurosis that is as old as the race, the anxiety states may be thought of as being the recent product of an artificial culture. Nevertheless, it is easy to accept the superficial view that it is the pace of modern life that is responsible for the prevalence of anxiety states. It would be more correct to regard the relationship as a vicious circle. The essence of anxiety is an interference with the psycho-physical rhythm of biological man. Primitive man lives to satisfy his simple instinctual needs. In so doing he experiences little frustration and encounters few alternatives. Civilized man, on the other hand, is like Pavlov's dog, whose salivary reflex was conditioned to a circle but not to an ellipse. As the ellipse was made to approximate more and more to the circle the dog was beset by uncertainty. His difficulty of discrimination produced a state exactly comparable to human anxiety. The essential feature of modern civilization which is responsible for anxiety is scope. The primary aspirations and necessities of man can be modified, stimulated, satisfied in so many ways that twentieth-century man hardly knows what these aspirations and necessities are, while he is feverishly trying to choose between an unending variety of indirect and partial satisfactions. It follows from this that anxiety is caused, not only by the difficulty of discrimination, but also by the feeling of frustration that is inherent in these modified satisfactions. And the more this partial frustration makes itself felt the more eagerly does modern man devise further opportunities of partial satisfaction. In so doing he extends the scope of his life, and thus the demand on his discrimination and choice is increased. This, in outline, is the vicious circle of a mechanized culture. The anxiety states are, at the same time, a product of that culture and an important element in its promotion.

Hysteria, as has been seen, is a condition in which the patient strives to modify her emotional environment. The true anxiety case accepts the menace or hostility of his environment. He is occupied with the problem of escape. In other words, the hysteric is determined to elicit a solution of her problem from others. The anxiety patient recognizes that the solution must come from within himself. The true hysteric elaborates her histrionic symptoms out of a basic organic need. The anxiety patient suffers from emotional conflict which frequently appears to have no relation to instinctual demands. The primitive instinctual pattern of all hysteria is the cave woman who says to herself, " I shall never bear a child unless I induce a man to father it." The primitive pattern of anxiety is the man who says to himself, " Even if I find an acquiescent mate what if I fail in carrying out my generative function ?" In other words, the solution of the hysteric's problem is outside herself, that of the anxiety case is within himself.

The key word for the hysteric is " Pose," for the anxiety case it is " Fear." It has already been seen that the gonads are involved in the etiology of hysteria. In all anxiety cases it is the adrenals that are involved as the link between fear and its expression. The mobilization of sugar is the metabolic mechanism whereby the nature of a man's anxiety manifests itself in the familiar syndrome of the tense, emaciated, over-acting patient. Glycæmia may be regarded as the correlate of feeling in all anxiety states. These states involve hyperglycæmia when emotional tension is at its height, and hypoglycæmia when reaction and exhaustion set in.

The conflicts which give rise to anxiety are as varied as the opportunities which civilization offers of partial satisfactions, and as numerous as the situations that involve frustration. In terms of Pavlov's dog, primitive man is confronted with many circles and a few unmistakeable ellipses. Civilized man encounters few circles, but myriad forms that might be either a circle or an ellipse. The conflict that results may be met by successful adaptation if the necessary qualities of temperament and character are available. Otherwise, a neurosis ensues. If the temperament be extraverted the symptoms will be centrifugal and therefore hysterical in quality. If the temperament be introverted the symptoms will be centripetal, that is, the patient will retreat within himself and manifest anxiety.

Anxiety hysteria.—From what has just been said it would follow that hysteria and anxiety are mutually exclusive conditions. This would be so if human temperament always corresponded to a pure type. In point of fact it is frequently an admixture. An introverted thinking type may manifest an extravert feeling function. In such a case a neurotic syndrome may be observed that is partly centripetal and partly centrifugal—now a true anxiety state and at other times a frank hysteria. The patient is found now retreating within himself in subjective misery, now parading his wretchedness before the exasperated wife or the sympathetic mother. His symptoms are therefore partly resultant and partly purposive.

OBSESSIONS, PHOBIAS AND COMPULSIONS

These conditions hardly deserve to be reckoned as functional disorders. They represent a constitutional trend to repetition. They stand, therefore, in strict contrast to the dramatic and creative polymorphism which belongs to hysteria. What is frequently described as an obsessional neurosis is in reality a state of anxiety occurring in a repetitive temperament. As such, it is the exact opposite of conversion hysteria which is hysteria occurring in a creative temperament. In each case the constitutional factor conditions the nature of the neurotic compromise. In each case the constitutional factor can, and does, influence normal adaptation. Thus the man who is by temperament essentially repetitive may make a most valuable servant of society in the capacity of a reliable robot. If and when he encounters in life an obstacle that he cannot negotiate, his breakdown will necessarily be an obsessional neurosis. Contrariwise, the creative actress when she finds it necessary to have a " nervous breakdown," will develop a rich histrionic symptomatology that is a morbid echo of her dramatic triumphs. Hence the woman who develops a knife-phobia as the outward expression of her sexual maladjustment, cannot be the same person that staged hysterical fits in public places, though the causative factor may have been the same.

CYCLOTHYMIA

In every form of functional disorder, without any exception, a concurrent factor of cyclothymia may be present. Manic-depressive insanity is the fully developed manifestation of an organic failure, which, as far as is known, is always constitutional and never acquired, which is apparently linked up to endocrine balance, and which shows little or no tendency to be affected by psychological factors of any kind. In its most mitigated form it can be recognized as the accepted variations of mood that characterize the menstrual cycle of the normal woman. Cyclothymia is of the utmost importance in the diagnosis of every functional case. For instance, a man may be suffering from an acute anxiety. Appropriate analytical treatment reveals the relationship of his present love situation to a morbid love-experience in childhood.

The patient continues to be depressed. The physician is perplexed and discouraged. Treatment is suspended. The patient returns to work or goes for a sea voyage—it matters not which. Three months later he reports himself as feeling " fitter than I have ever felt before," and proceeds to draw the fallacious inference, " What really put me on my feet was getting back to my job and sticking it out," or, as the case may be, " That sea voyage made a new man of me and I wish I had gone at once without wasting time over all that psycho business." The probability is that he is quite wrong, and that the " psycho business " will make a certain improvement in his emotional adjustment that was called for, and that his cyclothymia will continue to repeat its mysterious recurrences whether he sticks to his work or goes for sea voyages. The factor of cyclothymia can be neither established nor excluded by clinical examination. It will continue to elude those who put their trust exclusively in an Œdipus complex or an electrocardiogram. Its detection—certainly for the present—must remain a matter of scrupulous investigation of the patient's history and of genetic data.

SCHIZOPHRENIA

The differential diagnosis of this condition is often extremely difficult. Few cases are diagnosed as schizophrenia that have not been previously labelled " neurasthenia," " anxiety," or " hysteria." In a sense, however, the undiagnosed schizophrenic is not so elusive as the mild cyclothymic, and, in that his condition tends to be progressive rather than recurrent, there is less scope for the repetition of imperfect diagnoses.

THE WEIR MITCHELL TREATMENT

It may serve as a useful summary to examine in detail Weir Mitchell's method of the " Rest Cure." In the first place, the patient was very strictly isolated for six weeks. Now, Weir Mitchell entitled his book " Fat and Blood," maintaining the organic basis of neurasthenia. It is obvious, however, that isolation is not a physical, but a psychical, method of treatment. In point of fact, both the hysteric and the anxiety case derived immense—if transitory—benefit. The hysteric was deprived of her audience. So minutely was this carried out that Weir Mitchell made a great point of having a single nurse in attendance on each case. On the other hand, the anxiety patient was relieved of all choice. There were no alternatives. Life was an inexorable routine of passivity. But with the anxiety patient, as with the hysteric, such artificial elimination of obstacles is liable to have only a palliative effect. Neither of them has received anything that promotes a permanent solution. In fact, the rest cure was in itself a form of retreat from reality that could provide permanent benefit only to a small minority.

The second important item in the rest cure was super-alimentation with large quantities of milk. This worked excellently for all the intestinal toxæmias, and for many vagotonics. The third item was general massage. This, of course, favoured the elimination of toxins, no doubt, and helped even patients with septic tonsils to put on weight—temporarily.

It will thus be seen that the rest cure met the immediate, if not the more permanent, therapeutic demands of neurasthenics, hysterics and anxiety cases. The methods in vogue to-day are more specific and more fundamental, but he would be a bold man who asserted that the results were commensurately better.

In conclusion, the following keywords may help to crystallize the views put forward in this article :

Neurasthenia—Acquired fatigability.
Psychasthenia—Constitutional fatigability.
Hysteria—Pose and the creative life.
Anxiety—Fear and frustration.
Obsessions—The repetitive temperament.
Cyclothymia—Constitutional rhythm.

EARLY SYMPTOMS OF MENTAL DISORDERS

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THERE are two general reasons why it is useful and important to recognize mental disease in its early stages : the obvious one that it may be possible to arrest the evolution of the disease, and the other that in certain mental diseases the consequences of a social and financial kind, if the condition is overlooked until it is well advanced, may be extremely serious. The former reason is not so potent as some of the enthusiasts for early treatment maintain. The progress of some cases of mental disease, no matter how early they are observed, appears to be nearly, if not quite, relentless. This is especially true of schizophrenic psychoses, which proceed in some instances to dementia (dementia præcox) with the gradualness of inevitability.

Mental disease is singular in this respect, that the " symptoms " are often but exaggerations of the normal traits of character and temperament, so that it is difficult to say where the personality ends and the " disease " begins. The dividing line, if any there be, is often a matter of social rather than of medical considerations. This transition, or evolution of the disease out of the ordinary personality of the patient, is so striking a feature that it has given rise to a theory of causation of certain mental illnesses, which regards them as simply the manifestation of a deterioration in mental habits—a cumulative process of faulty adaptation to the environment, until finally the patient altogether parts company with reality, and with the behaviour enjoined by society.

The onset of some mental illness is, however, quite different from this—so sudden as to be labelled in the more graphic way of foreign writers as "catastrophic." But it is a constantly repeated observation that closer inspection of most alleged sudden beginnings shows that it was rather that the people concerned with the patient had their attention suddenly drawn to his condition, whereas, in fact, symptoms of some kind or another had been present for a long time. The symptoms of mental disorder, early or late, can be classified under five headings—of conduct, feelings, capacity for thinking, topics of thought, and vegetative functions. It is convenient to consider the early symptoms in the categories of the main types of mental illness.

MANIC-DEPRESSIVE PSYCHOSIS

An examination of the life histories of patients with the depressive types of this group of mental disorder will show that a considerable proportion of them had habitually exhibited a tendency to worry and to overwork, to moodiness, lack of confidence, and oversensitiveness. But these in themselves should be regarded as predisposing factors rather than as indications of the actual beginnings of a breakdown. The latter is commonly marked by an increased intensity of a number of these characteristics. A typical beginning is as follows: The patient wakes too early in the morning: instead of sleeping till 7 or 7.30 he finds himself wide awake at 5 or earlier, and this happens regularly. The hours from 5 till mid-day or near it are spent in a state of depression or apprehension or both. The feeling of depression has a quality not experienced before, its "blackness" and the feeling of helplessness in face of it are very different from the recurrent gloom that mere moodiness involves. In the latter part of the day the patient may feel like his usual self again. But he learns to dread the early waking and the first few hours after that. He finds increasing difficulty in concentrating, and in making decisions. He gives the impression of being fussy, partly because his lack of concentration leads to uncertainty in his mind as to what he has done, and he feels obliged to go over the same ground again. At the same time, the other vegetative functions besides sleep, begin to suffer. He loses appetite, and either eats little or wolfs his food in a state of anxious preoccupation with other things. Soon the sense of inadequacy may become overwhelming, and the full-blown stage of depression arrives with its feelings of unworthiness and self-accusation and its suicidal preoccupations. Fatigue is an occasional early symptom, as it is of most mental illnesses.

In other cases, an increasing preoccupation with health is the prominent early feature. In still others the onset is truly sudden. The patient wakes up one morning with a feeling of utter hopelessness or of unreality. In such cases a careful search of the history will often show transient milder experiences of the same kind, lasting only for a few days, long before the onset of the present illness.

Symptoms of the anxiety type are especially frequent in the earlier stages of depressive illnesses and, especially at the involutional period, it is important to watch for a transition from what appears to be one of the milder forms of mental illness, namely, a state of psychoneurotic anxiety, to a depression of the involutional melancholic type. At all stages, however, morbid fears, either with or without special reference, like " a nasty feeling of apprehension " or fears of specific things, especially of illness, are common precursors of the full-blown depressive symptoms. It is the same with paræsthesiæ, especially in the head (e.g. " muzziness " and feelings of tension and movement in the head) and in the mouth—the patient worries constantly over a new denture which, in spite of alterations, never seems to fit. Tinnitus and giddiness are other frequent paræsthesiæ of the same region in the same circumstances; but the paræsthesiæ may, of course, be referred to any part of the body, more especially the heart, the respiratory system, and the bowels. Clearly there is a danger that with so much preoccupation with physical ill-health and so many paræsthesiæ relating to certain organs, irrelevant surgical procedures may suggest themselves to the doctor who does not recognize the true nature of the condition. Restlessness, which is a prominent feature in some forms of the fully-developed disease, shows chiefly at this stage in a feeling that one must walk quickly and work quickly, e.g. if there is an employee to be dismissed, the job must be got over as soon as possible. It should be added that another early phenomenon in these anxious apprehensive people consists in running from one doctor to another; but this happens even more in the milder anxiety of the psychoneurotic type.

Insomnia is a traditionally honoured symptom of mental disorders of all kinds. Disturbances of sleep are perhaps the most reliable, more or less objective indications of mental distress, and never more so than in depressions of the type under discussion. The disturbance is not always in the direction of insomnia; there are a few depressed patients who sleep too much—from reluctance to face the work which has become so painful to them; but this occurs more in the depressions seen in unstable or psychopathic people who have never been much use in the world, than in the depressions of the episodic or manic-depressive type.

Loss of weight is another indicator of many mental disorders, especially in psychotic depressions; but in cases of milder degree this may not occur, and sometimes even an increase in weight is recorded in the earlier stages. Loss of weight occurs partly as the result of the diminished food consumption that comes from loss of appetite.

Amenorrhœa can hardly be described as an early symptom of most depressions; it will appear only when the illness is already established, and this only in the deepest depressions.

Manic excitement is often difficult to recognize in its early stages, or in its milder forms. Yet its recognition is very important, since the patient so afflicted can involve himself and his dependents in great embarrassment, social and financial, before the layman realizes that anything is amiss. At first it looks like a mere excess of energy. The patient is here, there and everywhere; works long hours, is up late and early, seems to find no work too much, can do with three or four hours' sleep, and undertakes responsibilities far beyond his means. He wastes a great deal of time in talk; he tells stories but seldom comes to the point; and his conversation in general is apt to be tactless and lascivious. If he is criticized or interfered with he becomes irritable.

It may not be possible to restrain him legally by certification at this stage; but recognition of the condition may enable other steps to be taken, since the patient may still be capable of persuasion and may be induced to put himself in a nursing home on the palatable excuse of nervous exhaustion, or some such label.

SCHIZOPHRENIC PSYCHOSES

With typical cases of this condition (in older terminology, dementia præcox), i.e. cases with a gradual onset and slowly progressive course, the early symptoms are considerably different from those just described, and the transition from previous personality to unmistakeable breakdown much more insidious. But it is to be remembered that some cases can begin comparatively suddenly, and that when this occurs, especially in the young, the actual symptoms themselves, in the earlier phases at least, may be very difficult to differentiate from manic-depressive symptoms.

It is especially the schizophrenic type of illness which seems understandable as an accentuation and development of previously existing traits of personality. Examination of the case records of patients with this type of illness has shown that long before they became evidently diseased they exhibited such characteristics as the following: shyness, reticence, seclusiveness, sensitiveness and stubbornness, with little interest in the pleasures and pursuits of the ordinary person, and, in fact, with abnormally little capacity for enjoyment or emotional experience of any kind (except, perhaps, for hatred). They are often "goody-good," if they are children or adolescents, or if they are older they are pedantic. They do not give one the impression of being comfortable with other people, or at ease in themselves. They lack courage and push, and are good because they do not dare to be otherwise. They are often religiose rather than religious and cranky rather than scientific in their other interests, being absorbed in perpetual-motion machines and other impossible devices.

In the most typical case it is found that the shyness and lack of sociability have increased; the few friends he had have ceased to call, and bookishness has been gradually replaced by dreamy preoccupation. Signs of still further diminished energy are apparent—the patient is not minutes but hours late in appearing in the morning, and sooner or later he may not succeed in getting up till the late afternoon. Irritability appears if any attempt is made to break into this routine. He is increasingly careless of his appearance, and he seems to have to summon a smile with great effort on social occasions; he shakes hands limply or refuses to shake hands at all. Misinterpretations of the environment are evident, often of a queer description: the patient mistakes his mother for a boy at school or the masters at the school are boys in disguise.

In other instances a period of brooding, especially of worry over masturbation, is followed by an outbreak of excitement in which persecutory ideas are prominent. The worry over masturbation is often associated with complaints of pain or muzziness or tightness in the head. Or the period of brooding may be followed by an attempt of a person of previously quiet, submissive disposition to assert himself: he becomes rude and domineering and boastful, but there is a fantastic trend in the boasting, and the blustering attempt to dominate shows signs of underlying timidity and uncertainty.

If the lives of such personalities are traced further back it is found in some instances that from time to time in his life, even in his childhood, the patient has given vent to transitory ideas that people were taking unusual notice of him, or machinating unpleasantly against him. He has perhaps always slept badly: not falling asleep till midnight. He has shown curiously ill-balanced interests, he has this or that on the brain. One boy I knew found his favourite recreation in conducting imaginary church services, persistently neglecting play with other boys in favour of this. Obsessional interests of this kind may have been far more prominent than with the average child, and the candidate for schizophrenia may show his likes and dislikes far more readily even to the extent of frequent exhibitions of cruelty. Along with these signs of general emotional ill-balance there often goes—contrary to the general belief—an inadequate interest in sexual matters. It might be said that the sexual life of a candidate for schizophrenia is characterized by its feebleness—masturbation is as a rule the only sexual experience he permits himself, and that is characteristically wrapped round with conflicts and followed by inordinate fatigue. Occasionally, as if in a desperate attempt to assert himself sexually, the early schizophrenic indulges in some sort of sexual aggressiveness; but again it usually shows traces of lack of energy—he contents himself with exhibitionism. In other instances, there is an oddity about the reactions to the opposite sex. A young man comes on a visit, and the patient reacts by going off her food, and making an isolated odd remark, e.g. that she " feels his eyes looking at her through the floor." Or after meeting his girl a young man flops in a chair, won't speak, won't eat, and is so preoccupied that he does everything with extreme slowness.

ORGANIC PSYCHOSES

The best known early symptoms of organic brain disease (apart from those associated with focal lesions) are those betokening general cortical insufficiency, and consist in failure especially of such general functions as memory and attention. The patient himself is not so apt to complain as his relations and business acquaintances are to notice the falling off. It is very characteristic of organic brain disease that the patient lacks insight for his defect. Others notice that he is forgetful of names or appointments, or that he adds up amounts wrongly, or that he has arranged a programme of work for his pupils or employees and forgets to ask for the results at the appropriate time. But the failure is often so slight as to pass unnoticed for a considerable time, and the relations are suddenly surprised and shocked by some gross aberration of conduct such as theft or sexual misconduct of a grossly stupid kind. When such episodes do take place they are usually marked by such extreme lack of judgment as to carry their probable diagnosis on the face of them.

When, as in some instances, especially in general paralysis, there is a mood disturbance as well as a failure in the intellectual faculties, so that the patient is full of a sense of well-being, the social and financial consequences can be serious. Grandiose, ill-judged plans, involving vast expenditure may be embarked on, or boon companionship may be struck up with undesirable acquaintances who only seek to rob him of his money; or sexual adventures of a particularly compromising kind may be indulged in. Wherever there is a character change of this sort, in a previously respectable and conventional individual, in middle age, organic brain disease, and especially G.P.I. should be suspected. The elated type of beginning is naturally far more easily detected: it is the gradual deterioration that may be missed for months. One of the difficulties is that on formal examination in the early stages of such conditions very little that is abnormal may be found. Memory tests are not always of service, since with an effort the patient can come up to them. The soundest course to advise in any suspected case of this sort is a period of observation away from his usual surroundings and responsibilities. This may require a good deal of tact in its arrangement, as the patient, having no insight, will not readily admit the necessity for any investigation. Such conditions may, of course, begin with focal symptoms, before any mental change has been noticed by the usually not very observant relatives. The first sign for example, may be the occurrence of a seizure. In such a case it is easier to persuade the patient of the necessity for an investigation.

PSYCHONEUROSES.

The remaining large group of prodromal symptoms to be discussed are those characteristic of psychoneurotic conditions, i.e. anxiety conditions and hysteria. Here the study of the personality in which the conditions arise is of special interest because so often the illness itself is an intensification of what has long existed; but an intensification on a usually more localized, less socially disabling scale than in psychotic conditions.

In a group of 37 patients with anxiety psychoneuroses the traits that had existed more commonly before the onset of the illness were concentration on work to the almost complete exclusion of definite recreations, yet often with actual dislike of their particular job; sexual difficulties; emotional instability with a strong bearing to the depressive side, with a pessimistic attitude, a general tendency to worry, and some specific fears; a capacity for affection of the dependent rather than of the protective type; a predominating feeling of inferiority and lack of confidence and initiative, yet with considerable ambition and sensitiveness; shyness and reserve, with lack of inclination or of ability for social intercourse. These characteristics, if a number of them are put together, might be regarded as precipitating factors towards the occurrence of a psychoneurotic anxiety state. Some of them are strictly homologous with symptoms of the latter condition which is often simply an exacerbation and diffusion of what has existed for nearly the entire life of the patient.

Perhaps the commonest beginning of a more or less disabling psychoneurotic anxiety state is a sudden one, in the form of an anxiety attack, consisting in palpitation or a pain in the head or giddiness. This has often been preceded by a period of rumination with resulting fatigue and malaise. The fatigue itself in these cases is the expression of a mental conflict which has already begun, but it has often in the past been mistaken for a cause of mental breakdown.

On the other hand, those 24 patients who subsequently developed a gross hysterical reaction had been, by comparison with those who developed a psychoneurotic anxiety state, as a rule much less energetic, and in fact, often sluggish and even lazy. They had been not only shy and reserved, but apt to be negativistic, i.e. stubborn, counter-suggestible and readily antagonized. But the most pronounced difference between those who developed gross hysterical symptoms and those who displayed symptoms of the psychoneurotic-anxiety type, was the frequency with which the hysterics had exhibited anti-social reactions of a more pronounced variety, ranging from the holding of strong revolutionary political views with an obvious self-interest, to a frankly persecuted attitude to society, and even actual delinquency. Other characteristics of this type were inebriety, bad temper, untruthfulness, persistent quarrelling with the family, lack of moral feeling and a general lack of conscientiousness, and of any sense of social responsibility.

The tendency for hysterical symptoms to appear in people with inferior standards of conduct of this type is not surprising if hysterical symptoms are regarded as essentially dodges to evade difficulties. In a sense the symptoms are simply a continuation in the guise of illness of what has been an habitual attitude.

Other candidates for hysterical reactions appear to be emotionally childish and immature, the Peter Pan type of personality which will not grow up. This is perhaps more obviously seen in women; often in women who are over-attached to their father, and at loggerheads with their mother. Such patients are commonly fond of "showing off," and demand an enormous amount of attention from their environment. When the latter revolts, the patient falls ill and tries to get by that means what the other methods —the prodromal symptoms, as they might be called— have failed to procure. A martyred attitude is also a common one with them.

It seems, therefore, that in many, although not by any means in all, mental illnesses the appearance of symptoms in the ordinary medical sense is only another milestone on the path of a development which stretches back for many years.

THE PHYSICAL FACTOR IN MENTAL DISORDER

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THE part played by the physical factor in the etiology of mental disorder has always presented a problem of a contentious character. In the light of modern science, however, the study of mind and its disorders has progressed enormously and it may safely be stated that both the psychological and physiological schools of thought have established a just claim to a prominent position in the field of medicine. None the less, to the broad-minded observer, there still appears to be in the mental attitude of the psychological extremist not only a reluctance but a positive antagonism towards the physiological aspect of mental disorder. In spite of this opposition the physical factor is forcefully protruding itself into the domain of causation as a possibility and a probability.

RELATIONS OF MIND AND BODY

It is hardly possible to define in any accurate way what the mind is, but on the grounds of what it does it can be regarded as dynamic in character and this supports the ancient philosophy which taught that " everything quivers and flows." In association with this doctrine, it is interesting to note that at the present moment experiments are being carried out to establish the physical basis even of thought and the possibilities of its transmission and the results of this work if successful may eventually fall in line with the principles of electronic vibration.

By a healthy functioning the mind can be regarded as the adaptive mechanism by means of which inner and outer relations should harmonise. The fluid and intricate activities of the mind are responsible for outward expression which forms the total personality and strictly speaking no part of the integrated organism can, through any cause, become impaired in function without affecting the whole in some way. There is thus good reason for believing that every organic bodily change must have its psychological correlate or reverberation in the mind and vice versa. Everyone is aware of the mental changes that inevitably follow any gross upsetting of normal physiological processes. The feeling of exaltation which arises when the nervous system is bathed in a blood stream surcharged with alcohol; and the depression that so commonly follows in the train of hepatic disorder are examples of this. Further there is the sense of well-being when appetite has been satisfied to a sense of repletion; the anxiety and fears of the individual who suffers from a surfeit of thyroid secretion; the spes phthisica of the consumptive; the delirious world of the febrile patient; and the delusional world of the general paralytic. There must, however, often be subtle and hidden organic disharmonies which are probably the basis of mental symptoms which present themselves, but of which there is little knowledge. This should be as true for the simpler everyday aberrations of the mind as of those deviations from mental health with which the psychiatrist has to deal. Moods, desires, ambitions and impulses are largely conditioned by the underlying physiological processes which may or may not be in balance with the rest of the organism.

TEMPERAMENTS AND TYPES

For generations it has been fully recognized that the individual temperament is dependent on the fundamental organic factors. Thus the familiar types of the melancholic, the sanguine, the choleric, and the phlegmatic, which were formulated long ago, are even to-day quite acceptable in their classification. Each particular form of temperament undoubtedly has a physiological basis of its own which perhaps again has its root in some hereditary, embryological influence. The results of research and clinical observation clearly shows that with this peculiar inheritance is wrapped up the problem of endocrinology. In relation to its physical basis, each temperament will differ and in each one there will be different impulses of thought, feeling and conduct. Modern psychology has classified individuals into two types—those with an extraverted and those with an introverted temperament. The former is the type of individual whose mental energy is mainly directed towards the environment, who is impulsive, social in outlook and reacts to feeling. The latter type of individual has his mental energy mainly directed inward on to the self, is not so readily adaptable to social surroundings and reacts mostly through reflective thought. It is not presumed that mankind can be divided into these classes in any hard and fast way, but nevertheless these types form a useful step in a conception of temperament and the underlying physical factors.

Some valuable contributions have been made in correlating these mental types with more or less definite forms of physical or structural build and not only is it shown that scientifically there is a linking up of the organism with the mental factors but furthermore that according to the physical substratum, there would be a tendency to certain kinds of mental disorder should it at any time develop. Thus an individual whose build is of the extravert type would be more liable to hysterical reactions, or mania, or melancholia, whereas the physical class linked with the introvert is regarded as more liable to those symptoms of psychasthenia or dementia præcox. This is a great step in establishing a scientific connection between structure and function; between the physical and the mental. Modern study has shown more and more conclusively that the great link between the body and the mind is the endocrine system via the sympathetic nervous system. For many years it has been known that the condition of mental deficiency known as cretinism was due to an under-development of the thyroid gland and the consequent lack of its secretion. In such cases, to witness the almost daily changes towards normality of mind when thyroid gland is administered, presents one of the miracles of medicine. Since this discovery much has been learnt of the chemical and biological properties of the other ductless glands and there is now considerable clinical evidence to show that these glands work together for common good and that impairment of balance in this sphere is responsible for much warping of character and mental instability.

TOXÆMIA

Another important chapter in any discussion on the physical basis of mind and its disorders must deal with toxæmia. The toxic factor generally is obvious and practitioners are familiar with patients who have exhibited toxic symptoms in association with general disease, which have been responsible for the perverted functioning of the mental faculties. Among the admissions to mental hospitals, a high percentage show evidence of an acute or chronic form of toxic process and some mental conditions which hitherto had been regarded as being functional in character are now being placed in the toxic category. In some cases of acute excitement which may be considered under the heading of mania, there has been found a definite toxicity in the blood serum of the patient which can be readily demonstrated on a nerve-muscle preparation in the pathological laboratory. This sphere of investigation offers an attractive outlook with great possibilities. It is also realized nowadays that in a great number of the depressed states met with in the practice of psychological medicine, there exists ample evidence of auto-toxæmia, in most cases originating from the alimentary tract, and from research in this direction there have been rapid advances in the successful treatment of mental disorder. In many cases the original toxic focus may be traceable and may be located in the teeth, the tonsils or one or other of the sinuses in close proximity to the nasopharynx, to which reference will be made later.

Attention must also be drawn to the group of cases in which pancreatic glandular deficiency has developed in the course of alimentary toxic infection in a similar manner to that occurring in cases of infective cholecystitis. It is now established that many anxiety states are the outcome of pancreatic deficiency and readily react to specific treatment which confirms the diagnosis. It is obvious that in the absence of effective pancreatic digestion, the intestinal tract provides a suitable medium for the multiplication of bacteria with subsequent fermentation and putrefaction. This condition of affairs often creates the first movement of a vicious circle of extending toxæmia and as such it will be found frequently that the functioning of the liver becomes impaired by the irritative effect on its cells produced by the poisonous products of imperfect digestion brought to them by the blood of the portal system. That this process actually exists can be proved by the help of biochemical tests. In view of these remarks, and the knowledge that the majority of patients who exhibit signs of nervous and mental disorder suffer from intestinal stasis, special attention must be directed to the hygiene of the entire alimentary tract, not forgetting, as mentioned above, the possibility of disease extending upwards through the nasopharynx. Beyond question, such a toxic condition of affairs does affect the functioning of the endocrine glands with consequent disturbance of hormonal balance or equilibrium. Many cases of mental disorder looked upon as being chronic and incurable have on further investigation presented ample evidence as to curability and with this end in view, effective treatment of septic tonsils, teeth and other toxic foci have resulted in mental recovery. From the studies made by psychiatrists of reputation it has been found that so-called functional psychoses invariably show the presence of accompanying infection often of a subtle and insidious character. The fact that many harbour focal infection without any mental symptoms is not an argument against the theory that this infection can cause mental disorder.

HISTOLOGICAL CHANGES

In addition to advances made in the domain of biochemistry, knowledge of the histology and pathology of the brain has been greatly increased, and Bolton's work in this respect has revealed an intimate association between cellular change in the brain and mental abnormalities. With this recognition there is now considerable knowledge of the pathological alterations in connection with certain mental disorders and especially with regard to mental deficiency. In general paralysis the brain changes are well known and mental disorder and change of personality in various forms of dementia are found to be due to lesions in the third cortical layer and in harmony with this it is known that twenty years ago Alzheimer held the view that the pathological changes in adolescent psychoses then termed dementia præcox were to be found in the third layer of the cortex.

ARTERIAL DISEASE AND OXIDATION

That mental functioning normally or abnormally has an intimate relationship with the physical substratum is also confirmed by the large amount of arterial disease found in the pre-senile group of mental cases.

In the presence of most forms of persistent toxæmia, it is not a surprising fact that arteriosclerosis in some stage of development is found and apart from the special forms of mental disease with which it is commonly associated it is not infrequently noted in mental deficiency, maniacal depressive insanity and dementia præcox. On the other hand the probability is that the association of mental disease with arteriosclerosis in general is not one of simple cause and effect but the common result of many and varied detrimental factors such as the chemical causes, heavy muscular work, endogenous and exogenous toxins, hypochlorhydria, oral sepsis, thyroid deficiency, syphilis and excessive protein diet. It is certain, however, that arterial disease is common in mental hospitals even at comparatively early ages and as such may be closely associated with inherited tendency to biochemical anomalies.

The health of the mind and the oxygenation of the brain are certainly closely connected. Not infrequently those who suffer from advanced cardiac disease with congestive failure show symptoms of delusions and hallucinations which can often be banished by the supply of abundance of oxygen to the brain. Equally characteristic phenomena result from a marked increase in the amount of oxygen supplied. Those who work in caissons are not strangers to distinct elation and sense of well-being from the greatly increased atmospheric pressure in which they temporarily find themselves. These effects may even progress to maniacal exhilaration.

Deficiency in the oxidation processes in the nervous system would seem to play an important part in the phenomena of dementia præcox. This deficiency may be generalized, it may possibly be thyrogenic as evidenced in reaction tests in some diseases of this gland or, on the other hand, this deficiency may be limited to the brain. Such a deficiency too, affects metabolism as noted in a disturbed acid-base equilibrium and in other ways, e.g. lowered basal metabolic rate. Among other physical manifestations of dementia præcox may be mentioned the decreased fragility of the red blood corpuscles which has been proved by laboratory findings, and as such may tentatively be explained from the biochemical standpoint ; this may probably be associated with a generalized inherent tendency to deficient oxidation processes and thus dementia præcox may eventually prove to be a deficiency disease.

Encephalitis lethargica, from the clinical point of view has been given a position of strategic importance in both neurology and psychology. Children who suffer from this disease tend to show mental reactions which are functional in type but evidently produced by an organic brain lesion. It may be debated whether the behaviour disorders of encephalitis are characteristic or specific and to be differentiated from that of psychopathic or problem children. The emotional disorder of chronic encephalitis is a factor of the greatest importance to the psychiatrist. Their outbursts seem comparable to those observed in traumatic and other organic conditions. The clinical course of the behaviour disorder in children should be associated with a persisting active process in the brain, febrile attack, or even injury to head. Most cases at the start show some neurological signs such as cranial palsies, tremors, tics, persisting sleepiness and in some cases Parkinsonism. With some improvement of the behaviour there is a definite tendency for the neurological signs to disappear. Here is seen *par excellence* the relations between mental reactions and an organic basis. In close association with the problem of encephalitis it may be stated that clinical observations of shrewd and experienced observers have led them to believe that a certain percentage of cases which are placed under the heading of schizophrenia are in reality suffering from a form of subacute encephalitis of a low-grade type.

HYSTERIA ON A PHYSICAL BASIS

As evidence to show that keen interest in all directions is being taken in the physical basis of nervous and mental disorder, Kinnier Wilson in discussing hysteria has propounded certain principles which give much food for thought. He outlines an argument that physiological processes lie behind nervous manifestations at all levels, that the cortex of the brain considered as a ganglion cannot differ inherently in function from the infracortical ganglia except as regards complexity. Reflex actions which occur in this region are to be expected in analogy with those located on a lower level. Physiological research is reducing steadily the numbers of functions once ascribed to "volition." It seem logically sound to speak of cortical activities in physiological terms alone and to avoid use of the psychological term "will" altogether. Generally speaking evidence somewhat favours the view that the hysteric is born and not made. By the bulk of the medical profession, hysteria has been regarded as a typical mental disorder arising from more or less purely mental causes, and yet keen and experienced observers state that the hysterical determinant is most likely physiological and not psychological, and weak will is better spoken of in physiological terms such as failure of one cortical element to inhibit another and as such perhaps the physiological basis of will is inhibition. In this way the peculiar features of hysterical motor disorders received a simple explanation on a physical basis.

CURATIVE EFFECTS

It is of interest to note that the same agents that are apt to bring about psychological disturbance in those who are predisposed, may at times by a physical process have a beneficial influence upon an already existing diseased state of mind. For example, years ago, by the use of setons, suppuration was encouraged for its stimulating effect, and it is an established fact that to-day in mental hospitals, the development of an abscess or carbuncle is welcomed in certain types of mental disease. Furthermore strikingly beneficial results have been observed in those cases in which an acute suppurative process has developed necessitating surgical interference, after which, for no other reason, patients have become perfectly normal in mental outlook and conduct for varying periods of hours or even days, on some occasions resulting in complete recovery.

SCHOOLS OF THOUGHT

Although it has been especially insisted that the mind in health or disease has a physical setting, yet the impression must be avoided that mental disorder is due to any one simple factor. In all probability there are many influences at work, some playing an important part and others being only contributory in some degree. It is in deciding which factor is paramount that so many psychiatrists differ. The psychogenetic school believes that the mind has a structure and nature of its own and that though its workings are always expressions of the integrated human organism it can, through conflict and stress, become warped in its functions by following definite and explainable psycho-pathological principles. Members of this school would regard the mental factors as primary and look upon any endocrine disturbance or organic change as secondary. The physio-genetic school, the views of which are here supported, does not by any means deny that psychological factors exist, but acknowledge that it is the pathological somatic condition which is responsible for calling them in force. No one can possibly deny or belittle the influence that heredity plays in bringing about a type of constitution that is highly liable to develop mental disorder given sufficient stress or strain. This hereditary influence is much more marked in some forms of mental disease than in others, but whether great or small, its potency was resident in the chromosomes of the germinated ovum, that is, it had a structural basis the true character of which is unknown, but can be modified in more than one way. For generations past there have been controversies on the question whether heredity or environment was the most potent factor in moulding mental reactions. Perhaps the hereditary factor was usually emphasized too much so that mental disorder was regarded as something for which nothing could be done. In latter years it is believed that much may be done to obviate possible mental abnormality by hygienic measures.

From the complexity of this subject, bristling with possibilities in all directions, it is obvious that those who approach it even with an open mind, may be induced to follow too rigidly some particular narrow channel of research without obtaining results of any immediate practical value, but naturally reliable data of any kind eventually may help to build up a mosaic of scientific importance. At this stage it is evident to those who have studied the subject widely, that this problem is essentially biological and as such, attention must be directed to those factors which are responsible for anomalies in structure or function. As regards structure, there is ample evidence to show that whenever defect of this kind arises from inheritance or disease in the domain of the nervous system, definite physical signs and symptoms are the outcome, usually enhanced by some degree of mental disturbance. In a similar manner, abundant proof is daily forthcoming from the study of medicine generally that many diseases hitherto obscure in origin are in reality deficiency diseases and as such it may be assumed that lack of immunity against any particular disease is due to deficiency factors which may be the outcome of faulty inheritance either in structure or function. Similarly, in the etiology of mental disorder, deficiency both in structure and function plays a prominent part and should the individual possess by inheritance or acquire by disease, a low "psychical melting point," unbalance of mind and dissolution will rapidly develop in the presence of one or more of the various exciting factors which have been already mentioned. From the prattling stage of infancy to the waning of mentality during senescence, mental conflict of some kind or other is inevitable and a great deal depends on the somatic state when the mind is more than usually harrassed. Everyone fully realizes how different his mental reactions are when prolonged worry and fatigue have carried him to the degree of exhaustion.

CONCLUSIONS

When a case of delirium is encountered, search is at once made for a bodily factor and invariably some infective toxic or febrile state is found. This high state of mental confusion is readily associated with somatic disorder; but with other types of mental disease it is not so easy to link up the symptoms with some hidden physical morbid condition. On careful review it may be assumed that the ultimate mental symptoms or personality change present themselves through the medium of the endocrine system which which have already been considered as being responsible for the creation and maintenance of a healthy mind and body. Obviously this is of great practical import in the matter of treatment. In a case presenting any mental abnormality, be it a neurotic disturbance or a definite psychosis, it is absolutely essential that in the first instance a searching physical examination should be made in order to discover the causal factors and eliminate them if possible. Unfortunately it is too commonly assumed that the physical condition of a mental patient is good and more often than not any examination that is made is far too cursory. Cases are frequently met with which have been treated for a long time by psychotherapy without beneficial results and when a careful survey of the body state has been taken, it has been found that a physical basis exists and when this has been adequately dealt with the mental symptoms disappear.

In order to assess the real value of the signs and symptoms present laboratory tests must be applied and these are invariably helpful in elucidating causal factors. Particular attention should be paid to the complete examination of the blood, urine and excreta, not forgetting that the use of the ophthalmoscope may prove profitable.

As practitioners are not always in a position to obtain help from a laboratory, it is usually advisable, when circumstances permit, to obtain admission for the patient to the modern mental hospital offering atmosphere and conditions, to which no reasonable patient, in the early stages of illness, could possibly take exception. In the modern mental hospital will now be found not only well-equipped laboratories dealing with problems of bacteriology, pathology and biochemistry, but also the latest equipment to carry out physiotherapy in all its forms, namely hydrotherapy, electrotherapy and heliotherapy. In order to encourage early recognition and treatment of nervous and mental disorder and thus to stimulate progress in psychiatry, it is essential that both the laity and the medical profession as a whole should view mental unbalance as an illness analogous with physical disease, and it is satisfactory to note that the authorities of general hospitals are recognizing this suggestion.

DEPRESSION

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All the world is melancholy, or mad, and every member of it. I can but wish myself and all of us a good physician and a better mind.—*Burton.*

THE problem of mental suffering has interested mankind from the earliest times, from the days of Job and Jeremiah, of Schopenhauer and Tolstoi to the present day. The causes of this ill, the manifold disturbances resulting from it and the means of relief will continue to concern medical practitioners, priests and philosophers as long as the struggle for existence itself.

Julius Caesar Cludinus called melancholy "the fountain of all other diseases, and so common in this crazed age of ours, that scarce one of a thousand is free from it." "It is a disease so grievous, so common, I know not wherein to do a more general service, and spend my time better, than to prescribe means how to prevent and cure so universal a malady, an epidemical disease, that so often, so much, crucifies the body and the mind." So says Burton in his *Anatomy of Melancholy,* written in 1651, but the classification he gives is somewhat out of date and includes such forms as hypochondriacal or windy melancholy and such causes as dry brains, hard belly, thick blood and leaping in many places! Among causes of the malady he includes hereditary temperament, loss of money, liberty, honour and friends; certain diseases, head injuries, alcoholism; venery, chastity, unrequited love; excess of study or idleness, too little exercise or overmuch. Diet, too, he considers a matter of importance and beef he condemns as it breeds "gross melancholy blood. Good for labouring men but unfit for such as lead a resty life." Pork he regards as "unfit for such as live at ease, naught for queasie stomachs in so much that frequent use of it may breed a quartan ague." "Coots, didappers, curs, sheldrakes, and peckled fowls—though these be fair in feathers, pleasant in taste and have a good outside (like hypocrites) their flesh is hard, black, dangerous, melancholy meat." Burton went into the matter in some detail and altogether his treatise, though not on modern lines, is full of good things.

Depression, anxiety and pain are perhaps the commonest symptoms in medicine, but the first two are often not mentioned by the patient who is more apt to describe the physical discomforts which result from these disorders of feeling. Both depression and anxiety are liable to undergo "conversion" and there is no system in the body which is immune from the results of such disturbances. Depression is in fact a mood disorder which results from a form of inhibition at the highest level of the nervous system. The prevailing feeling may be a sense of failure of a material or moral kind, of discouragement, of loss of interest, ambition, or any of the sentiments which drive an individual onward. It is a state of psychological defeat and regression, a sort of "encysted" state in which all activities mental and physical are slowed down and may be almost at a standstill. The retardation may be of slight degree but in severe cases it may lead to stupor. The depressed subject may be merely apathetic or may suffer an intense psychalgia sufficient to lead to suicide. Fear is aroused by anticipation of failure, defeat and pain. Depression may result from a realization of defeat, failure to realize the ego-ideal with a sense of impotence and futility in human endeavour. Effort ceases—"the patient says he cannot, his friends say he will not, the truth is he cannot will." There is indeed a paralysis of the will—a state of aboulia in which all striving seems impossible.

> Leopardi gives a vivid picture of psychotic depression "were I to go mad at this moment," he writes, "I believe that my madness would take the form of sitting with an amazed look always in my eyes, my mouth open, my hands between my knees and without ever laughing, weeping, or moving from the place in which I might happen to be, unless I were forced to do so. I have no longer the strength to conceive any desire, even the desire for death—not because I fear it on any account but because I can see no difference between death and this life, where I have nothing left to console me, not even grief."

Most cases seen in general practice, however, will be of a milder degree in which the arrest of feeling and thought is less complete.

INCIDENCE

The liability to develop states of depression is almost universal but is greater in certain types of individuals. Those of the pyknic habitus, as well as the asthenic and dysplastic, are more liable to depression than those of the athletic and sthenic types of build, as has been pointed out by Kretschmer and others. The " bilious," rheumatic, gouty, vagotonic, spasmophilic patients are more subject than those of the " sanguine " sympatheticotonic types who have a good peripheral circulation.

Among psychological types the introvert is more liable than the extravert, the man of thought rather than the man of action. As Sydenham said of the gout " more wise men than fools suffer from this disease." The sensitive artistic person is more liable than the " duck's back " individual who is better protected from the " slings and arrows " of ordinary life. People with endocrine insufficiency, especially of the thyroid, adrenals and gonads are liable to spells of depression.

Melancholics as a class are, according to Wiersma, distinguished by greater susceptibility to affections, the measure of sensitiveness; a reduced activity, i.e. impulse to and pleasure in work; and a greater psychical after-effect, i.e. the power of calling up images, the forming of associations and mental concentration. They have therefore greater unity, connectedness and consistency in thinking and acting but have often a certain " stiffness," a lack of social adaptability, and do not feel at ease in large companies.

The depressive is often, but by no means always, a person of low vitality. Accounts of the lives of great men frequently indicate that they appear to have suffered from bouts of depression. Perhaps only shallow natures are entirely free from this liability. The young are supposed to be less liable than the old, but Browning held that the latter half of life was better than the first and some will agree with him. It is possible that the only people who are always happy may be in institutions for the insane. I remember in my student days being struck by the happiness of some of the inmates of Earlswood Asylum for the feeble-minded. Such people know nothing of the "splendid spur" which most people need if they are to do much with their lives.

> Dean Inge quotes Borrow "How dost thou know that this dark principle is not thy best friend? It is ever near the favourites of God—the fool knows little of it. Thou wouldst be joyous wouldst thou? Then be a fool. What great work was ever the result of joy, the puny one? Who have been the wise ones, the mighty ones, the conquering ones of the earth? The joyous? I believe it not."

Depression is to be distinguished from sadness which, according to Spinoza, is never justifiable, and the mediæval monks placed mere boredom among the seven deadly sins. It is, they said, a compound of dejection, sloth and irritability. Religion can for many be a great source of happiness but the religious temperament and the melancholic diathesis are, according to Professor James, one and the same.

TYPES OF DEPRESSION

For the purposes of classification of states of depression it may be convenient to divide them into three categories.

(1) *Psychotic depression* in which the patient lacks insight and accessibility. He does not appreciate the fact that he is suffering from illness nor can he co-operate successfully in treatment in the active sense.

(2) *Autonomous depression.*—These states are very common—probably as frequent as headache and the

etiological factors may be similar. The attacks are usually of short duration and may begin and end suddenly. The patient may state that he does not know what caused the attack or he may attribute it to " liver," indigestion, or fatigue. He has had attacks before and other members of the family may have suffered from migraine, gout, asthma or other recurrent neuroses. This form of mood disorder is in fact a paroxysmal neurosis and, as in all such illnesses, the primary factor is a constitutional one—and exciting factors such as bacterial invasion, fatigue, weather changes, indigestion, constipation, or menstrual disturbances merely determine the attack.

(3) *Psychoneurotic or reactive depression.*—Here the depression is due to emotional factors of which the patient is aware—the death of friends or relatives, the loss of fortune or position—or to causes of which he is unconscious. In the latter case the patient and others may attribute his condition to overwork, the need of a holiday, but it may be found that the real cause has been repressed, and psychological analysis, often of a simple kind, will be necessary before the real cause of discouragement is made clear.

Briefly it may be said that the psychotic depressive is ill and does not know it, he needs care, not active treatment; the autonomous depressive needs reassurance that his attack will clear up and often some common-sense advice about the technique of living—food, sleep, exercise and mental hygiene. The patient with reactive depression needs psychological treatment. Something more than reassurance will be necessary here. In those cases in which the causal factors are unconscious, methods of analytical psychology will be needed if the patient is to be brought face to face with the real causes of his defeat so that he may be helped to overcome them.

In making the above classification, which is useful for clinical purposes, it must be considered whether or not the division of depression into these categories is really justifiable. It may be said that all that has been done is to describe the same symptom with its different degrees of apathy, depression or " pain in the mind " in people who are: (1) periodically insane, (2) liable to periodic physical disharmonies of endogenous (e.g. metabolic, endocrine) origin, or who are under the influence of some toxic depressant, or (3) suffering from the effect of emotional disturbance resulting from shock, loss, or mental conflict (conscious or unconscious). Actually it is found that the division between one type of depressed person and another is not sharply defined, the " either-or " distinction cannot be drawn and many patients belong to more than one category. Severe examples of the manic-depressive type must be called psychotic, whereas the milder and much more numerous cyclothymic cases will be classed as autonomous. Psychoneurotic features, moreover, may be present in both psychotic and autonomous cases. The main criterion of a high or low psychotic potential will be the degree of insight and accessibility in the patient under consideration. The autonomous factor will be indicated by the history of previous attacks in the patient or relatives and the concurrence of other paroxysmal neuroses.

Many depressed patients will show signs of the " neurotic personality," emotional instability, hypersensitiveness to all kinds of stimuli, abnormal fatiguability and phobias of various kinds. Such persons tend to be easily depressed and discouraged by difficulties and disappointments which would not daunt people of a more robust " make up." They readily undergo psychological regression to states of depression and dependence on others. Their depression usually gives rise to disturbance of bodily function and this brings them to the doctor; they seldom complain merely of depression but, if treatment is to be effective, it is important to realize that this is primary.

THE PHYSICAL BASIS

The physical basis of the depressed states may now be considered. Functional depression of a nerve cell results in cessation of extra-nuclear chromatin production. While there is a separate anatomical basis for fatigue of excitation and fatigue of depression the symptoms of these two conditions may be identical, although in the former the production of chromidial substance fails, in the latter it is inhibited. In many cases of simple depression the nerve cells are "resting," and this may be worth pointing out to patients who feel that they can never recover their normal feeling and efficiency.

This state of inhibition, with a lowering of the excitability of the nervous system as a whole, may be due, especially in psychotic states, to a congenital lack of excitability or to toxic depression. The lowered excitability to the CO_2 stimulus gives rise to anoxæmia. There is a disturbance of the acid-base equilibrium—a lowering of the p^H of the organism, which approximates to that obtained during sleep in the normal individual. These results were obtained by Golla, Mann and Marsh in psychotic patients at the Maudesley Hospital. It would be interesting to know whether the hibernating animal shows similar blood changes.

Kooy found unusually high blood-sugar curves in patients in states of marked emotional depression. But despite the interest of these physical findings, little is known of the causal nexus behind many depressed states.

In psychoneurotic patients some challenge of life, some alteration in the environment which may be positive or negative, e.g. an increase of the load of responsibility or the withdrawal of some stimulus such as love, may cause this state of inhibition to supervene. It may be compared to the closing up of flowers on the withdrawal of the stimulus of sunlight, the " sulk reaction " of a child, or the reaction of the proverbial camel when the last straw is put on his back. Again it suggests the reaction of Pavlov's dogs which, having been " conditioned " to expect food after the ringing of a bell, on repeated disappointments following the sound stimulus, merely lay down and went to sleep, a somewhat similar form of inhibition.

Depressed states are often associated with anxiety, and in such instances the symptoms may resemble one form of instinctive reaction to danger, i.e. defence by concealment or inhibition of bodily activity instead of by the " flight " or " fight " reactions. In such cases the inhibition is active instead of passive, as in depression resulting from deprivation of love or withdrawal of the stimulating influence of another personality on whom the patient was dependent.

If simple depression or depression with anxiety is in psychoneurotic patients a sort of instinctive reaction to " deprivation " or to danger—to which some people are especially liable—it ought, when the mechanism is made clear to the patient, to be as much under conscious control of the will as losing the temper or running away when frightened. Children are expected to learn in time to control their temper, their flight reactions or their " sulks," so why not grown-up people? The depressed patient, however, lacks insight. He may complain not of depression, but of vague pains, discomforts or loss of function which are the result of depression and not as he would say, the cause of it; or, on the other hand, he may admit that he is depressed, but be unaware of the cause, or he may be satisfied with a wrong rationalization—that he is run down or tired. His idea of treatment may be to get away for a holiday, but it may be found that this is merely an expression of a wish to escape from the difficulties which have caused discouragement. Until the mechanism of this instinctive reaction to frustration or deprivation is made fully conscious and accepted by the patient he cannot be expected to control it. The intelligent reaction to such a situation, when the patient realizes it, is increased effort, better directed effort, or it may be striving in some other direction, and not " flight " into psychoneurosis.

SYMPTOMATOLOGY

The lowering of excitability of the nervous system as a whole leads to lowered activity in every part of the body. The functions of assimilation, elimination, respiration, and reproduction are all reduced to a low level as are muscular tone and often blood pressure. There is a general paralysis, mild or severe, of thought, feeling and action. The disintegration of the personality may proceed as in some organic diseases affecting the central nervous system (arteriosclerosis, paresis), the highest sentiments (altruism, courage, faith, love) are lost first and the patient becomes self-centred and may regress to a state of vegetative passivity and dependence on others. The lowered " psychic tension "—to use Janet's expression—may lead to symptoms of functional disturbance in any part of the body and the patient may concentrate on any of these and attribute his depression to it. His practitioner may accept this " cart-before-the-horse " explanation of the condition, and symptomatic treatment alone, medical or surgical, may drive the patient still deeper into depression and conviction of incurability.

Man's struggle for survival is of two kinds: (1) against the forces of nature, e.g. bacterial infection, cold, damp, starvation, leading to organic disease, and (2) against society. If the breakdown and discouragement result from the latter struggle—which becomes more severe almost daily—it is important to realize that the nervous depression is primary and the anorexia, indigestion, constipation, impotence, visceral migraine (and other vasospasmodic and painful conditions) are secondary. It is perhaps not an over-statement to say that 80–90 per cent. of these patients with symptoms of pain or functional disturbance receive only symptomatic treatment. Psychalgia may undergo " conversion " into pain in any part of the body and these cases are far more common than is generally realized. Symptomatic treatment of such patients often does more harm than good as it merely confirms the patient's faulty rationalization of the origin of his dysphoria. The treatment, moreover, is often given in a half-hearted fashion so that even the element of suggestion is absent. It is no wonder that such patients often resort to unorthodox methods of treatment.

ETIOLOGY

It is obvious that the etiological factors of the depressive reaction, whether this be called psychotic, autonomous or reactive, are numerous and may include both endogenous and exogenous influences. The onset of depression may be determined entirely by endogenous factors and occur suddenly without any apparent exciting cause.

> " In sooth I know not why I am so sad
> It wearies me; you say it wearies you;
> But how I caught it, found it, or came by it
> What stuff 'tis made of, where of it is born
> I am to learn;
> And such a want-wit sadness makes of me
> That I have much ado to know myself."

The Merchant of Venice who speaks thus may, of course, have been suffering from dental sepsis or postinfluenzal depression, but it is more than likely that he was merely a person subject to attacks of autonomous depression and had often felt like it before. Perhaps his love for Bassanio had in this instance something to do with it.

A man of fifty came to see me in a state of great dejection. He burst into tears while describing his feelings. He could not give any cause for his state of misery—he was a rich man, happily married, a director of many companies with plenty of interesting work. I suggested that he had had similar attacks before. He admitted this but, as usually happens, he declared that it had never been so bad on previous occasions. On returning to his office he noticed on the daily calendar a quotation from the writings of Thomas à Kempis—" It will pass, it has happened before and if you live long enough it will happen again." He was struck with the coincidence and brought the page of the calendar at his next visit, by which time the depression had disappeared.

The relationship of autonomous depression to other paroxysmal neuroses is shown in the case histories of many patients.

Male, aged 59, was in early life subject to attacks of " acidosis " or " bilious " attacks. About puberty these attacks ceased but he began to suffer from paroxysmal headache of the migraine type and later, in middle life, he seemed to lose his headaches but became subject to spells of depression lasting one to three days. During the last few years the attacks have become more frequent and of longer duration.

This is a case typical of many but it is not always realized that the symptoms described are due to the same constitutional factors. Rarely cases of migraine undergo in middle life what has been called " the epileptic transformation " and the patients come under treatment for fits of unconsciousness often associated with fits of severe depression.

Short spells of depression lasting a few days may be determined by such trivial causes as a late night, emotional or menstrual disturbances, the onset of a cold in the head or changes in the weather. Dr. Petersen in his three volume work on *The Patient and the Weather*, deals exhaustively with this latter factor and shows how often attacks of depression, migraine, epilepsy and asthma are determined by sudden barometric, hygrometric and thermometric changes. Periods of severe depression, lasting weeks or months, may follow acute infections, especially influenza and malaria, childbirth, the menopause and operations. In almost all these cases there will be found a constitutional factor—an inborn liability to this form of reaction. In some cases the exciting factor seems to be specific—the bouts of depression occurring only after childbirth, or in other cases only after influenza. Gouty subjects and those of gouty heredity are especially subject to periods of depression in which the blood uric-acid percentage may reach a high level. People of rheumatic diathesis frequently suffer from states of depression, sometimes associated with pains and sometimes alternating with them—when they are free from pain they are liable to be depressed and vice versa.

The number of factors determining the onset of states of depression may be multiplied indefinitely, focal sepsis, allergic reactions and so on, but the essential factor is an inborn constitutional one, or as Adler has insisted, some " organic inferiority." It is not the disturbance but the patient's reaction to it which determines the onset of depression and regression—and the reaction may be at the highest level, psychoneurotic, at a lower level, i.e. neurotic or autonomous, or at a deeper level resulting in psychotic depression.

TREATMENT

The conception of depression as a reaction involving different levels of the nervous system is a guide in deciding what treatment is indicated. The psychotic patient, as stated above, will need care rather than active treatment. The danger of suicide is greatest in such cases but in every depressed case the risk must be borne in mind, and if the patient is accessible, it is probably wise to discuss the matter with him. Depressed patients are usually truthful and honest, and although they may try to evade giving a direct answer, they will rarely give a promise they do not intend to keep. If a patient definitely states that he has no intention of taking his life it is almost invariably safe to believe him. The psychotic depressive usually needs institutional treatment, skilled nursing, appropriate sedatives and symptomatic treatment.

Autonomous depressives, a much more numerous class, in which the depression is of the neurotic rather than the psychotic or psychoneurotic variety, will not, except in severe and prolonged cases, need treatment in an institution. From what has been said of the nature and causes of such autonomous states it will be obvious that the treatment will be largely symptomatic and preventive. Nothing, it would seem, can shorten the duration of such illness—" even by one hour " according to some authors. Nevertheless a great deal can be done to make their suffering more bearable and many practitioners find that such patients are among their most grateful ones when they have recovered their normal health. Although little may be done to relieve the depression or to shorten its duration a good deal can be attempted to prevent or diminish the psychological regression which is apt to complicate the depressed state. The patient is accessible and can be given insight into the nature of his symptoms both physical and mental, and the assurance that these are common, well understood and appreciated by the physician, together with the confident assertion that they are temporary, that they are not leading to insanity or permanent mental impairment—all this is a comfort to the patient. It is not the symptom—the apathy, depression or psychalgia—so much as the patient's reaction to it which determines whether the regression is slight or severe, and this will depend a great deal upon intelligent and sympathetic handling of the patient by his medical attendant. The patient must have faith in his practitioner—that he understands and appreciates his illness and the practitioner must have faith in his patient—that he has enough " fundamental moral worth " and intelligence to render psychotherapy helpful. By such methods the patient's confidence and courage are aroused and he is helped to " see it through " without loss of *morale*—and hope may be given that he may find a " way of life " to render him less liable to subsequent attacks. Here lies a large field of preventive medicine, in the avoidance of or diminishing the frequency of all types of paroxysmal neuroses. This will involve consideration of all possible secondary factors in the etiology—focal sepsis, allergic factors, endocrine deficiencies, and metabolic disorders. In prolonged cases certain physiotherapeutic measures, e.g. massage, heliotherapy, aids to elimination, and occupational therapy, in addition to appropriate sedatives, may all have their place in lessening the patient's suffering and making him feel that " something is being done." In the milder cases it is important to distinguish between depression and fatigue especially as the subject often complains of the latter symptom rather than of the former. True fatigue is increased by any effort, physical or mental, and will be cured by rest alone. Depression on the other hand is often relieved by increased activity. If we " take a large hoe and a shovel also and dig till we gently perspire " there will be an increased feeling of well-being if the condition was one of simple depression of spirits resulting from a sluggish liver and circulation.

The patient who is liable to autonomous depression will often ask " Should I go to work when I feel like this—on my 'bad days'? " The answer in most cases will be that he should go to the office and carry on as best he can, though he cannot expect to be at his best. He may leave difficult work, if this is possible, until he can deal with it in an effective manner. In doing this he will become better able to control his reaction to his moods instead of becoming more and more controlled by them.

In reactionary or psychoneurotic depression the breakdown or loss of function is at the highest level—the patient has lost courage, " the lovely virtue," as Barrie called it in his address to St. Andrews students, " and when courage goes everthing goes." Faith, hope and love—all the sentiments which drive an individual along the road of life are simultaneously extinguished. It is as if a lighting system had failed and the highest elements fail first. The machinery comes to a standstill—effort ceases. The loss of friends, relatives, position, fortune or honour may determine this reaction, in which case the onset may be sudden. But the failure of courage may be gradual and due to causes which are by no means obvious to the observer, or, indeed, to the patient himself. Failure of achievement in the material, intellectual or moral sphere may lead to discouragement and cessation of striving.

The onset of the menopause and all that this means to a woman—that she can no longer bear children, that she may lose her husband's affection, her power of attracting others, that her " love life " is over, all these feelings, whether well founded or not, may lead to discouragement and depression. Middle age in men, whose aims are not of the highest, may through sexual failure, diminished athletic capacity or failure of advancement in their work, be the cause of regression and failure to continue to face life with courage.

There is an unlimited field for psychotherapeutic treatment in cases of reactionary depression in which through frustration and disappointment the patient has, as it were, turned his back on life and sought refuge in psychoneurotic illness. The symptoms may be numerous and in any part of the body, but the cause is the same—failure of courage. It will be the practitioner's aim, not to send the patient for a sea voyage or to a foreign spa, to irrigate his colon, or remove his teeth, but to find out the real cause of his defeat and help him once more to face life boldly.

The depressed psychoneurotic has lost faith in God, in doctors, in everything and, if courage is to be aroused, the patient must be led to believe in something. This belief may be of the simplest, e.g. *noblesse oblige.* Most patients will agree that one *should* play the game of life till the end. Adler defines the neurotic reaction as a " yes but." The patient says " yes " to your philosophy of life " but " his symptoms are his excuse for not living up to it. It will be necessary to point out that he is not failing because of his symptoms, as he rationalizes it, but he is suffering from psychoneurotic symptoms because he is failing. The arthritic may limp because he has pain, the psychoneurotic has pain because he limps—the depressed patient thinks he is a failure because of his symptoms, but, in reality, he is depressed because he has failed in his adaptations—he is a discouraged and defeated person. He must be helped through insight to tackle his problems anew with courage and " a better mind."

In the majority of psychoneurotic patients the real cause of frustration and discouragement will be unconscious and some knowledge of the methods of analytical psychology must be employed to bring these causes into consciousness so that they may be faced and dealt with. " The mind will not tolerate an intellectual *impasse* " as Bernard Shaw has said—if the mental conflict or difficulty is brought into consciousness from which it has been repressed the solution will not usually be difficult to recognize though it may need moral courage.

Many men seem to think that a lessening of sexual vigour indicates that their other powers will decline simultaneously. It will be well to point out that some people have done their best work after the failure of sexual function. Reproduction is only one of man's activities and many great men such as Newton, Kant, Carlyle and Ruskin never achieved it.

The depressed subject has lost hope—his thoughts are of the past, his failures, his bad luck, his sins of omission and commission. " Forward looking thoughts", such as those concerned with the lives of children, are natural antidotes to depression and many of our women patients should be advised to adopt children if they have none, or at any rate to concern themselves with the care of children of others. Failing this, an interest in animals or pets, or even the care of growing plants as in gardening may be helpful. Some hobby or hobbies can be most valuable to some people but such interests are best begun early.

For the intellectually inclined some form of study, the learning of a language, writing of stories and reminiscences may be valuable, but the reading of novels and newspapers is not usually helpful. Work to be satisfactory should have some social value—in some way interest in the future must be stimulated and maintained—the game of life must be played to the end and " the struggle is the prize." The pursuit of false gods—power, possession and fame—is often destined to end in depression and defeat, whereas the pursuit of the " ultimate values," and work of social value give a good return in dividends—if the advice of the wise throughout the ages is to be believed.

A rational psychotherapy may do much to prevent the onset of depression with regression, i.e. contraction of the field of interest, which is apt to occur in patients of both sexes during the middle-age period, with its tendency to " physical, mental and moral sclerosis." Efforts must be made to avoid a " freezing up " of emotional channels just as it is important to keep the "blood lakes open," to use Mackenzie's phrase, by suitable physical activities. Old interests and activities may have to be given up but new ones should take their place before old age supervenes and the patient becomes, as he should at this stage, an interested spectator of life. Interest and activity must be maintained in all three spheres of normal life: in the home, in his work or substitutes for it, and in social life, and so avoid retreat into the hypochondriacal depression so common in middle-aged men on retirement and in women whose children no longer need their care and attention.

Most of our depressed patients have no religion, or their depression is associated with a "sense of separation from God." Jung has been struck by the fact that few of his patients are Roman Catholics and thinks this is due to the fact that these people go to their priest for consolation rather than to a medical practitioner. Most psychotherapists would, I think, agree with Jung. Certain it is that courage depends on faith of some sort and depressed people usually lack both. The depressed patient is like a defeated army and some way must be found to restore the *morale* and awaken hope and courage. The practitioner will sometimes find that he must fulfil some of the functions of the priest in those who are unable or unwilling to go to a purely spiritual adviser. Psychological investigation and treatment will be a different "language" but the result may be the same—help towards restoration of *morale* and social usefulness and the overcoming of a state of regression and defeat.

Medical practitioners may often find that they have to deal with depressed patients, whether this is expressed as fatigue, pain or functional disturbance, whose suffering is associated with a sense of guilt. The real cause may be conscious or unconscious. If conscious it may be felt that the matter is one for the priest rather than the doctor—if unconscious it will need to be brought to light by psychological methods. In either case they need not blench. Honesty is the best policy in both medicine and morals and they need not mind stating the obvious truth that life should be faced with courage, that all should strive to live up to their ego-ideal. Only conscientious people feel remorse, but if the depressed subject has lost hope and courage he *is* in a low moral state as well as a morbid mental one. If it is concluded that this state is not due to a state of toxæmia, anoxæmia or other physical illness, but primarily to some challenge of life the causes must be sought for and dealt with, although it may involve morals rather than medicine. Whatever the practitioner's own religious convictions may or may not be he must state boldly that he believes with Maeterlinck that the first duty in life is to face it with courage, to deal with and not to evade responsibilites.

THE PSYCHOTHERAPIST

Much will depend upon the personality of the physician if he is to gain and retain the confidence of his patient. Dejerine considered that the success of psychotherapeutic treatment depended upon the effect of one personality upon another, but there would appear to be more in it than this. It has also been said that psychotherapy consists merely of " common sense and uncommon nonsense," but the author of this " mot " was a surgeon. Kipling affirmed that the most powerful drug used in medicine was the spoken word, but a knowledge of psychological medicine makes the spoken word more accurately directed and more effective. All practitioners are not equally fitted for this kind of work as all are not suited to surgery or laboratory research. Some are more interested " in things than in people," and others may find the study of anatomical, physiological or pathological problems more attractive than the study of personality and psychopathology. Many practitioners have little interest in or patience with the nervous subject —they feel that psychoneurosis is merely "funk" and that such patients should be "bucked up" and told to think less of their troubles. Those who advocate this line of treatment are not likely to be successful as psychotherapists. The ideal psychotherapist should be a person of wide human sympathy and understanding, wide interests and education. He should be a philosopher who has succeeded in solving his own problems. He should "know himself" in the Socratic sense and have a definite attitude towards life. He should know more than a little of the workings of the human mind, of psychology and psychopathology—have a real interest in this branch of medicine and opportunities for study and practical experience. He must know, or think he knows, what he is talking about and have faith in his method of therapy whatever it may be. Although it is obvious that he must have a clear conception of the genesis of neurotic symptoms it is not necessary that he be a devout disciple of Freud, Jung or Adler, but he must have formed his own opinions and have his own method. Truth has many facets and there will always be different "schools" in such matters as there are different religions, philosophies and forms of treatment of peptic ulcer and other medical and surgical conditions. Successful methods of psychotherapy will not necessarily be identical although like different religions and scientific hypotheses they will have certain basis ideas in common. As Paracelsus said "Be your faith true or false it will work wonders." The history of quackery is full of miraculous cures—not always of imaginary ills but often of real ones--as soon as the patient feels confidence in their power a vicious circle is replaced by a "virtuous" one—habits of mind and body are changed and a new energy is released by a sense of encouragement. There is no reason why a rational psychotherapy should not produce similar changes in the patient's mind and outlook in a surer and more permanent way. Many thousands of doctors have the necessary " make up " to be good psychotherapists—how many are making anything like the full use of these powers? The busy general practitioner may object that psychological treatment takes too long; but a knowledge of mental mechanisms and a few hours spent in the early stages in taking a full history of the case, listening to all symptoms and trying to discover the real causes of these will in the end result in a saving of time. The confidence of the patient will, moreover, be gained in this way and he will not be tempted to try " quack " methods of treatment.

Psychotherapy has been called the oldest form of medical treatment but this is nonsense. It is true that since the earliest time cures have been brought about by effects produced on the patient's mind but it was not until quite recent years that the nature of the cure was understood to be due to suggestion and not directly to the charm, incantation, medicament, magnetic fluid or what not.

The search for the real basis of the patient's depression may need merely common sense and a knowledge of human nature but a certain understanding of, and experience in, the methods of analytical psychology will be necessary in many cases if the reaction is to be traced to sources which lie in the deeper layers of the subconscious mind.

The science of psychopathology is of recent origin and it is only when its principles are understood that it is possible to talk of any scientific therapy of the mind. It is said that every medical practitioner uses psychotherapy, but this is far from true if by psychotherapy is meant a rational procedure based on a study of psychopathology.

DEMENTIA PRÆCOX

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DEMENTIA praecox is a disease of the mind which occurs chiefly in young adults. It affects both sexes in about equal proportions and the incidence is higher in families in which there have been one or more insane members. The significance of this disease will be appreciated when it is realized that dementia præcox accounts for approximately one tenth of the total annual admissions to mental hospitals, and its gravity by the fact that it furnishes one quarter of their total inmates. From these figures it has been calculated that dementia præcox causes more permanent incapacity than any physical disease with the possible exception of tuberculosis. Dementia præcox is also known as adolescent insanity, primary dementia, and schizophrenia. The latter term is the one most commonly used at the present time, apparently with the object of avoiding the hopeless outlook which has become associated with a diagnosis of dementia præcox. Unfortunately it needs something more constructive than a mere change of nomenclature to alter the prognosis of a disease.

It was Kraepelin who recognized this condition as a clinical entity and separated it from that of the definitely more hopeful confusional and affective psychoses. An article of this kind, however, is not so much concerned with the fully-developed case of dementia præcox as with the premonitory signs and symptoms which may assist the general practitioner to arrive at an early diagnosis. It is essential that he should be able to differentiate its earlier manifestations from those physiological changes and vagaries of character which parents report to him at the critical post-pubertial period for at this time important adjustments due to awakening sexual consciousness and the first taste of economic independence are being made. In the opinion of most psychiatrists the first signs of dementia præcox are attributed too often both by parents and medical adviser to original sin on the part of the patient.

CLASSIFICATION

There are four main types of dementia præcox, which, however, frequently merge one into the other. They are: (1) simple; (2) hebephrenic; (3) katatonic; and (4) dementia paranoides.

In this article no attempt will be made to describe typical cases of each class, because the presenting signs and symptoms do not as a rule assist in deciding into which category the early case will eventually fall. Neither will præcox phenomena which are only seen in a mental hospital be described, as they can at best be of academic interest only to the general practitioner.

PRÆCOX PERSONALITY

The disease usually develops in a patient who has always been shy, retiring and unobtrusive, who may have had a good scholastic career but who has always lacked any particular ambition to make his way in life. (These patients correspond to the type which with some ephemeral success has succeeded in avoiding main issues by persistent side-tracking). It is not uncommon to get a history of ability above the average in many of these cases and not infrequently their breakdown is attributed to over-work or some other mental or physical strain. The number of occupations followed for short periods is impressive and may suggest an undue versatility until it is revealed that their many appointments have been terminated for quite trivial reasons. Oddly enough parents frequently acquiesce in, or support such changes of occupation and may extend much sympathy to the patient. The first changes of character occasion surprise, but cannot in themselves be regarded as evidence of insanity; thus sudden religious ardour usually directed along the more unorthodox lines or the unexpected development of the artistic temperament in a member of an essentially practical family may herald the more serious alterations of behaviour. In this respect it is advisable to suspect all religious conversions in young adults. These individuals are of the romantic, unpractical and, above all, unadaptable type in whom flights of imagination and their partial execution are merely a compromise with reality.

PRESENTING SYMPTOMS

The illness may present itself in a number of ways and the following is an outline of the more usual sequence of events:

The introverted child develops into a social recluse and becomes gradually more inaccessible to such friends as he may have made. Companions whom he had formerly neglected are now actively avoided and he prefers to remain in the shelter of his home and his parents. Excursions beyond his home are made at infrequent intervals and at unusual times. He neglects his calling for some trivial excuse and he displays a stubbornness which is foreign to him when he is encouraged to account for his altered ways. He remains entirely indifferent to the pleadings of his parents and in their turn they too are neglected and avoided. He begins to go for long solitary walks with no other object than to avoid interrogation, he fails to appear for his meals at the appointed hours, neglects his personal appearance and becomes an increasing source of anxiety. His parents are not so much perturbed about his altered ways as they are concerned about his strange attitude and general indifference. He becomes a stranger in his own household, he does not participate in its joys or in its sorrows and he is impervious to any emotional contact. He will accept news of the sudden death of a near relative or friend with less emotional display than a healthy person will evoke when reading of a fatal motor accident in which persons who are unknown to him are the victims. He may even smile inanely on the receipt of such news. His parents are perplexed or bewildered by this reaction as it is something beyond their understanding. It is this disconcerting lack of conformity between the spoken word and the mood or emotional expression which is so typical and constant a feature of the early dementia præcox case. The patient may greet you in affable terms with a fixed scowl on his face or he may cheerfully invite you to witness an attempt at suicide. Yet he remains well-orientated, expresses no delusions and as yet has given no evidence of hallucinations. As the disease advances he becomes more and more inaccessible and it becomes increasingly difficult to gain an insight into his condition. He will answer questions relevantly, curtly and usually monosyllabically but in a detached and impersonal manner. He is devoid of ambition and he shows a total lack of initiative. He may act strangely, laugh for no obvious reason and feel no need to offer excuse or explanation. At this juncture his parents, if they are observant, may inform you that they have noticed their child in an attitude of auditory attention as if he were listening to something. The patient, when questioned, will probably confirm your suspicion that he is suffering from auditory hallucinations. Here you have the first concrete evidence of a major psychosis. Speaking generally there will be usually more evidence of the patient's mental state in his writings or in his diary than may be gained from hours of tedious examination.

Another common mode of onset is exemplified by the young adult who consults his medical attendant too frequently for trivial reasons. He is usually much perturbed and preoccupied about sexual matters and he is of the introverted type which is predisposed to the development of dementia præcox. There is a lack of directness in his attitude towards life, and difficulties are avoided on the supposition that he is physically unfit. He differs from the neurotic type in that he usually has no symptoms to support his contention nor does he always permit of a physical examination. He tells his story in a vague and impersonal manner and he is quite unconcerned about the possibility of alleviation or treatment. He will state boldly that he has heart disease, that he has difficulty with his breathing or that he cannot pass water. If questioned he will agree that his physical endurance has in no way deteriorated and he will quite blandly accept your suggestion to collect a specimen of urine. Yet he fails to see that in agreeing he has in any way contradicted himself. On each successive visit he relates the same ideas in the same impersonal way and he gradually drifts into a condition of apathetic chronic invalidism. Quite recently a patient of this type, having observed that I had entered his ward, walked some distance along the corridor to inform me quite tritely that he could neither walk nor see. This is, of course, an extreme example, but it illustrates the dissociation between thought, action, and emotion. When he no longer feels that he is strong enough to visit his doctor he may attempt to maintain contact with him by letter writing. These letters may in themselves suggest a patient who is labouring under much emotional strain and who is profoundly concerned about his physical condition; this is in sharp contrast to his previous dispassionate narration of his symptoms. He is, in fact, capable of expressing more emotion in his letters than he can orally. Suicidal attempts are frequent in these cases and they are apt to be of a bizarre or extravagant character. Despite his stereotyped thought and action he may show a surprising originality in his mode of suicide. Suffocation may be attempted by placing a metal clip on his nose or by holding his breath. He may decorate himself in gaudy colours before hanging himself or he may endeavour to electrocute himself by some elaborate contraption of his own invention.

The type of onset in older patients is chiefly delusional. The delusions are of a persecutory nature. The patient leaves his employment because of the attitude of his associates; he claims that they go out of their way to annoy or irritate him, usually in a non-specific manner; he feels that they discuss him in a disparaging way, although he is usually prepared to admit that he has never actually heard them. He becomes solitary, suspicious and furtive in his ways, he talks of " influences " and he develops " ideas of reference." He believes that certain persons exert hypnotic power over him, that they control his mind, that they force evil thoughts on him or that they torment him by electrical currents. He finds personal references in the newspapers and he is apt to be litigious, aggressive and actively hostile.

The personality is not so grossly affected as in the other types of dementia præcox and such patients are often capable of pursuing what would be a logical course if their ideas were founded in fact. They inform the police, consult lawyers, and write voluminously on their grievances.

Hallucinations may affect all the senses. Taunting, accusing and insinuating voices lash them into a frenzy of destructive excitement. These outbursts are of a brief duration and subside as suddenly as they arise. The destruction is of a blind, wanton and purposeless character. When the attack is over the resultant chaos is usually surveyed by the patient in the most complacent manner. He may set about retiring for the night in a room which he has just previously practically demolished. Ideas of genital interference are not infrequent and are usually associated with actively homicidal inclinations. The instinct of racial preservation is most jealously guarded even in the insane.

I have recently had under my care a man suffering from paranoid dementia who, when informed that his brother had become a father, became very aggressive and declared that he wished his brother shot. When asked for an explanation he stated that he had been subjected to an illegal operation by his brother during which, he claimed, his testicles had been removed. He further elaborated this statement and maintained that it was with his testicles that his brother begat his child. The patient's hostility to his brother was based on the assumption that the latter had usurped his right to parentage.

The onset is likely to be sudden when there is an exogenous precipitating factor such as pregnancy, an acute infection or some profound mental stress. These patients pass rapidly into a condition of acute ecstatic excitement, simulating delirium, in which there is marked clouding of consciousness. The patient is grossly disorientated, identities and even sexes are mistaken. Strangers are greeted as friends and relatives. There is a ceaseless, sleepless, purposeless restlessness combined with a noisy incoherency. Gross hallucinations of all the senses give rise to strange and fanciful delusions. Natural modesty is entirely lost and in its stead erotic gestures and advances are given full sway. When consciousness clears, the patient becomes inaccessible and may be given to much meaningless laughter and obvious hallucinosis. Delusions tend to be of an extravagant nature which are rarely constant and are only occasionally expressed.

PROGNOSIS

The prognosis largely depends on the existence of a definite precipitating factor such as serious physical or mental stress. Paradoxically the more severe this factor the better the prognosis. This is readily understood when it is realized that the more stable the mind the greater the force required to overthrow it will be. On the other hand almost negligible stresses suffice to overturn a mind that is already tottering. It must be admitted that a large percentage of these cases eventually pass into a state of confirmed dementia. A more fortunate group enjoy good remissions which sometimes last for a number of years, but more usually they break down again within twelve months. Lastly, a certain number do make a good and complete recovery and are able to follow their subsequent occupations successfully.

TREATMENT

There is a time-worn fallacy that the onset of dementia is postponed if a præcox patient is allowed to remain in his own home until his behaviour, for social reasons, makes his admission into a mental hospital imperative. I am confident that many early cases are allowed to reach the chronic stage of their illness in this way in the belief that once they have entered a mental hospital all hope of recovery is lost. It must be stated quite categorically that this idea is entirely erroneous and that it in some measure accounts for the low rate of recovery from this malady. While it is admitted that there is an inherent predisposition in the majority of these cases, it must be remembered that only a very small percentage of the predisposed develop dementia præcox. It is reasonable to suppose that there are a number of persons who, subjected to physical or mental stresses just beyond what they can adequately bear, break down. It is both unwise and unjust to regard this group as incurable.

The active treatment is non-specific, as might be expected when dealing with a disorder of the personality. It is, however, desirable that a complete physical examination, in which all the accessory aids to clinical diagnosis are employed, be made an essential preliminary measure, as cases of dementia præcox have been known to improve after remedial medical or surgical treatment for such diverse conditions as septic tonsils and *B. coli* cystitis. When all physical disease, dysfunction or defect amenable to radical or alleviative treatment has been corrected, psychotherapy in a form best suited to the individual may be undertaken.

The question of the advisability of psycho-analysis is sometimes raised by a member of a patient's family. Although occasionally good results may be obtained success is nevertheless only possible in selected cases. The disadvantage of psycho-analysis in these cases is that it encourages intensive introspection in a patient who is already pathologically introspective. The simpler forms of psychotherapy are to my mind more suitable and any suggestion or persuasion that may help in maintaining proper contact with this environment is of a definite therapeutic value. In this respect it is well to remember that some degree of negativism is characteristic of dementia præcox and because of it direct suggestion is better avoided. It is wiser to provide the patient with the opportunity of interesting himself rather than to attempt to drive him. Much depends on the people within his circle, for unsympathetic or hard treatment will merely increase the patient's withdrawal from reality. In this connection it should be noted that the tendency to introversion develops slowly and adolescents who begin to show signs of becoming solitary and self-sufficient should usually be handled gently for a time, until their confidence begins to return. Even when psychotherapy is not applicable because of the patient's failure of co-operation through lack of insight or inaccessibility, much can still be done by re-education and occupational therapy. By thus maintaining his contact with reality the onset of dementia may be delayed for many years even in a patient with gross manifestations of the disorder. In conclusion it must be stressed that early admission to a mental hospital far from prejudicing the patient's chances of recovery considerably enhance them.

DRUG ADDICTION AND ALCOHOLISM

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AT the outset it is important to define what is meant by drug addiction. It may conveniently be described as a chronic condition of physical and mental abnormality in which the individual not only consumes some special drug but also, if his particular drug is cut off, craves for it and finds himself unable to lead his ordinary life without suffering grave discomfort and sometimes even alarming symptoms of collapse. It is highly appropriate that the subject of drug addiction should be included in this symposium on mental disorders. The greater the experience of the clinician, the more does he realize how large a proportion of drug addiction is associated with an underlying psychopathic personality. While it might be rash to assert that every drug addict or alcoholist is mentally abnormal, nevertheless, the proportion of addicts who can be regarded as mentally sound, in the sense of being free from a tendency to relapse, is singularly small. In every case of drug addiction, therefore, careful search should be made for evidence of pre-existing psychoneurosis or psychosis.

Drugs of addiction vary in their degree of danger. At the lowest end of the scale are such comparatively mild drugs as tea and coffee (although both of these have their addicts) ; tobacco, as in the case of " chain-smokers "; while the more pernicious drugs, in increasing order of seriousness, are alcohol, morphine, heroin and cocaine. In addition to these, in recent years there are sleep-inducing drugs, especially those of the barbituric group (veronal, nembutal, amytal, bromural, dial, medinal and luminal), also others such as chloral and paraldehyde. These hypnotics, which unfortunately could often, until recently, be bought without a medical prescription, frequently induce a drug habit in persons suffering from chronic insomnia, in the sense that the individual, although normal in the day-time, becomes unable to sleep without his habitual hypnotic drug, not necessarily in a large dose. Although the manufacturers never mention the fact in their advertisements, this group of drugs sometimes produces special paralytic effects upon the brain or spinal cord in chronic barbiturists. Still more serious is the increasing popularity of barbiturate compounds for suicidal purposes.

Of the foregoing drugs (excluding alcohol, the commonest of all) the best known are morphine and its diacetyl salt, heroin or diamorphine. Codeine and dionin are less familiar salts of morphine. These various alkaloids are derived from the familiar old-fashioned opium or poppy-juice. The drinking of liquid laudanum, the common method of administration in Europe over a century ago in the days of de Quincey, has become relatively rare. Nowadays the morphinist usually takes his drug by hypodermic injection. Addicts in Egypt prefer their heroin intravenously, with terrible results. The eating of solid opium still occurs among some Indian peoples, while the smoking of crude opium in pipes has been practically limited for generations to Chinese addicts.

Cocaine, the alkaloid derived from the leaves of the Peruvian coca plant, is a popular underworld drug, usually consumed by nasal inhalation as a snuff, colloquially known as "snow." Curiously enough, cocaine, being a local anæsthetic, sometimes induces a perforation of the cartilaginous septum at the spot where it is rubbed in. There are also various less common drugs of addiction, largely "patriotic," i.e. confined to special countries. Such, for example, is Indian hemp (cannabis indica or hashish), which, when smoked, usually in the Near East, induces voluptuous dreams. Another is the Mexican drug mescaline, which induces brilliant visual hallucinations, arranged in geometrical patterns and accompanied by an intensely happy emotional reaction.

OFFICIAL EFFORTS AT CONTROL

During the last quarter of a century government authorities in various countries, and even the general public, have become increasingly aware of the illicit traffic in dangerous drugs, such as morphine, heroin and cocaine, to meet the wants of drug addicts. From time to time sensational and even fantastic statements have appeared in the Press, calling attention to this social evil and to the existence of special factories in Switzerland, Germany, Turkey, Egypt, and elsewhere for the manufacture of such drugs and their sale all over the world, often at exorbitant prices. Even before the War an international committee was set up for the purpose of controlling this illicit drug traffic, while since the War the League of Nations has established a special convention to deal with the problem. The effect of these efforts has been to control the production of these drugs for legitimate medicinal purposes and to drive the activities of the majority of illicit drug-traffickers into other countries such as China and Bulgaria. China, however, agreed to initiate measures of limitation and control, while the drug factories at Istambul, having been interdicted by the Turkish Government, transferred their activities for a time to Sofia until there also they were suppressed by the Bulgarian authorities. In Germany and the United States severe restrictions have been imposed upon the prescribing and dispensing of these drugs; in fact, in the United States heroin is now forbidden, even when prescribed by a doctor. In Japan, however, the penalties for drug-trafficking are still deplorably inadequate.

In Great Britain in 1924 a special departmental

Committee was nominated by the Ministry of Health to examine and report upon the frequency of drug addiction in this country, and to suggest administrative measures for prevention and treatment. This committee issued its report in 1926. Collective evidence was obtained from nearly forty experienced witnesses, selected from the medical and legal professions, from the prison services, and from the leading pharmaceutical bodies. According to the findings of this committee, morphine and heroin addiction are relatively uncommon in Great Britain, and have been diminishing in recent years. Addiction is more readily induced by the use of heroin than by morphine, heroin addiction being admittedly more difficult to cure. Drug addiction is proportionately more frequent in great urban centres and among people who have to handle such drugs, e.g. doctors and pharmacists, also among individuals liable to nervous and mental strain. There is another relatively small class, including demimondaines, habitual criminals and moral degenerates of both sexes, who take such drugs, at first in the company of other addicts, in order to occupy their idle time, but later on as a relentless craving, from which they cannot free themselves.

Addiction is induced by using a particular drug over a period of time, sufficiently long for the formation of a habit, for the development of a craving, and for the occurrence of withdrawal symptoms of anaphylactic type, such as restlessness, collapse and emotional excitement, if the drug is suddenly discontinued.

I was one of those who gave evidence before the departmental Committee to which I submitted particulars of a series of 62 cases of drug addiction (36 men and 26 women) personally observed in private practice. In over two-thirds of these, morphine was the drug of addiction. Heroin occurred in one-tenth and cocaine in one-twentieth of the cases. The remainder were combinations of morphine, either with alcohol, or with other drugs. Hypnotic drugs of the barbituric group constituted only one-fifteenth of the total. Since that date, however, the popularity of barbiturates as drugs of addiction has considerably increased. Of the 36 male addicts in this series, by far the largest number, 15, were medical practitioners; the others, in diminishing order of frequency, being naval or military officers, business men, men of leisure, members of Parliament, University professors, barristers, explorers and artists. Of the 26 female addicts 17 were married and 9 unmarried: 12 of the married women were ordinary society ladies, 3 were doctors' wives with special access to drugs, one was a hospital nurse and one a lady novelist. Of the 9 unmarried women, 5 were high-class (i.e. expensive) demi-mondaines, 3 were society ladies, and one a hospital nurse. The maximum daily dose of morphine, according to the patients' admissions, varied from ¾ grain up to 30 grains, with an average of 7½ grains in men; and from 1 grain up to 40 grains, with an average of 10 grains in women. These figures almost certainly understate the true amounts. As to the causes assigned by patients as the starting-point for their drug-habit, I found that 38 cases out of 62, i.e. more than half, the morphine or heroin had originally been prescribed by a medical practitioner for the relief of some painful malady Insomnia or emotional distress was the exciting cause in about one-quarter of the total, this being the most frequent in doctor-addicts. Curiosity was the alleged cause in only six, three of whom were demi-mondaines and one a youthful homosexual male degenerate.

CHRONIC MORPHINISM

The symptoms of chronic morphinism vary from one person to another. In patients who have taken the drug originally on account of pain, there is temporary relief. But week by week and month by month the dose requires to be progressively increased in order to secure the desired euphoria. The chronic morphine-addict usually becomes emaciated; there is laxity and wrinkling of the skin and a dirty greyish pallor of the face. Puncture marks of hypodermic needles are often visible, especially on the forearms and thighs. The pupils are usually small (although not pin-point as in acute morphine poisoning), and react to light. He suffers from thirst and anorexia, but sometimes with a curious hankering for sweets. His mouth and throat are dry. He is emotionally irritable and restless. In female patients amenorrhœa is frequent. As a rule there is obstinate constipation. Albuminuria occasionally develops. As time goes on, the patient neglects the social niceties of life and tends to have badly-groomed fingers and face, with carelessness in minor details of dress. As time goes on and the daily dose progressively increases, the unfortunate individual, acutely conscious of his disability, fails to procure the adequate amount from his regular medical adviser or druggist, and tends to fall into the hands of illicit drug-traffickers. In every big city members of the underworld, and even medical practitioners, are to be found who are willing to supply the victim with additional quantities of his drug, always at extravagant prices. The addict tries to reduce or cut off his drug by voluntary effort, but always fails. He is then faced with the dilemma either of continuing with his illicit supply, at an exorbitant price, or of consulting his medical adviser with a view to being cured. The crucial incident which drives him to this decision is usually some accidental temporary failure to obtain his drug. He promptly develops distressing withdrawal symptoms, such as collapse, vomiting and pseudo-angina, together with profound physical and mental misery. He then realizes his desperate condition and turns for advice to his doctor. What is the doctor to do in such circumstances? The first thing is to find out whether the patient is really willing to be cured and, if so, whether he will place himself unreservedly in the hands of an expert for suitable systematic treatment. Unless full control of this sort can be secured, the wise doctor will refuse to undertake treatment. It is better to send the patient away for a time until he consents to submit unreservedly to the necessary conditions.

The treatment of morphinism.—The patient should be placed in a specially equipped nursing-home or hospital, with trustworthy assistants and unbribable nurses. On admission he is undressed and given a bath; meanwhile all his clothing and baggage are carefully searched for hidden drugs and hypodermic syringes. I remember an addict who gave himself a farewell dose of 10 gr. of morphine on the doorstep of the nursing-home just before he rang the bell. A drug addict's word must never be accepted, for it is interesting to note how often he brings with him a secret supply.

These preliminaries having been got over, the doctor has the choice of two methods of treatment. The first method is by gradual withdrawal or tapering of the drug, diminishing the dose day by day, over a period of many weeks, until it is reduced to zero, in the hope that the patient will thereby become dishabituated and lose his craving. Meanwhile atropine in minute doses, 1/1000 to 1/500 grain t.i.d. is given regularly, to maintain the vagal stimulation previously exercised by the morphine. Gradual withdrawal of the drug has the grave disadvantage that, on reaching a certain minimal dose or low-water mark, it is usually difficult or impossible to get below this and to reduce the drug to zero, not because of wilful refusal on the patient's part, but because his tissues have come to require a certain irreducible daily minimum, perhaps ½ grain or even less. Any attempt to get below this, by the gradual withdrawal method, produces discomfort which may be so intolerable that the patient finds himself driven to procure a secret continuous small dose for self-administration, even when ostensibly proclaiming himself cured. This difficulty, in getting below the patient's minimal dose, is the great flaw in the gradual withdrawal method. Even those practitioners who carry it out do not claim more than 15 or 20 per cent. of permanent cures, as related to the Committee of inquiry.

The second method is by abrupt withdrawal. This will cause acute withdrawal symptoms, lasting for several days, during which the patient suffers intense physical distress, unless his symptoms are overcome by special remedies which render him temporarily stuporose or even delirious. Nevertheless, the proportion of cures is much higher, amounting in my own experience to 60 or 70 per cent.

The abrupt treatment by hyoscine consists in a preliminary emptying of the intestinal tract by a smart aperient, accompanied by an initial dose of hyoscine hydrobromide 1/100 grain. The hyoscine is pushed to the point of producing a mild delirium. Every hour, for twenty-four to forty-eight hours, 1/200 grain is administered while carefully watching the pulse and respiration. Symptoms of hyoscine intoxication supervene. They resemble those of the other members of the belladonna group: the pupils become widely dilated, the tongue and throat very dry, and, within twelve hours or so, the patient develops a mild restless delirium accompanied by choreiform movements, picking at the bed-clothes, together with visual hallucinations, not as a rule disagreeable to the patient. When this stage is reached, usually in six or eight hours, the hyoscine is continued just often enough to maintain the delirium for twenty-four or forty-eight hours (giving 1/200 to 1/100 grain every two or three hours during this period). After this the hyoscine is stopped and the patient, when his delirium comes to an end, finds himself free from morphine-craving. During the early part of the hyoscine period it may be necessary to give a small dose of morphine, ¼ grain once or even twice. This will not affect the ultimate result. As a rule hyoscine alone is all that is required. Strychnine, however, may be added, 1/60 grain every six hours, to sustain the heart.

During the period of delirium the patient should have water to drink, to relieve the dryness of his mouth and throat. After thirty-six or forty-eight hours of artificial delirium, the hyoscine is discontinued and within two or three hours the patient is mentally clear again. Then begins the second phase of the treatment, which consists in regular hypodermic administration of pilocarpine, $\frac{1}{8}$ grain every hour for a total of about twelve hours, to induce sweating and thereby favour elimination of the hyoscine, gradually increasing the intervals between the pilocarpine injections. At the end of this period joint-pains tend to develop, especially in the knees and elbows, also pains in the back and diarrhœa. These pains are alleviated by massage, hot baths, or galvanism, and the diarrhœa is checked by a mixture containing bismuth salicylate 60 grains, with liquid extract of Bolivian coto bark 6 minims suspended in syrup. After the pilocarpine stage is over, great benefit is obtained by systematic general massage daily for a fortnight.

Another rapid (but not abrupt) method is carried out in two successive waves. The habitual daily allowance of morphine is cut down promptly by one-half, and the patient is given a mixture of belladonna, hyoscyamus and xanthoxylum in increasing doses, not enough to induce mental confusion or drowsiness. This is supplemented by systematic catharsis, together with large doses of sodium bromide 60 grains, or sodium luminal 10 grains, every six hours, for about a week. Meanwhile the morphine is rapidly reduced to 2 or $1\frac{1}{2}$ grains in the twenty-four hours. After a day or two of intermission the belladonna and hyoscine mixture is then resumed, supplemented by luminal or bromide, for another week, during which the morphine is steadily reduced to zero.

The British Committee pointed out that abrupt withdrawal can only be carried out safely under conditions of complete control in a special institution or nursing home, with close and continuous observation. For this reason the Committee preferred to recommend gradual withdrawal as the only method practicable in general practice or in patients who cannot afford or are unwilling to enter a special institution or nursing-home. Moreover, abrupt withdrawal is more risky in old and debilitated than in young and otherwise healthy persons.

Lastly, there is the class of hopelessly incurable addicts. This includes patients who for one reason or another have failed to cut off their drug, also patients suffering from painful and fatal diseases, such as inoperable cancer, or from profound physical debility, in whom the risk of withdrawal, even by the gradual method, is too great. In such cases the duty of the doctor is to notify the case confidentially to the Home Office inspectors, so that the patient may be placed upon the small official list of drug addicts for whom it is legally permissible to supply a regular stated daily quantity of the drug.

ALCOHOLIC ADDICTION

While no age is exempt, since even small children have been known to be afflicted, chronic alcoholism is usually a disease of middle life, especially of the third and fourth decades. The liability to develop alcoholic symptoms depends upon the individual's vulnerability to alcohol, this being often a matter of neuropathic inheritance. The form of alcohol habitually taken by the chronic alcoholist varies, to a large extent, with his social position and his pecuniary resources. Amongst well-to-do addicts the more concentrated types of ethyl alcohol, such as whisky, gin and brandy, are most commonly used, whereas in the poverty-stricken sections of the population, gin, rum, and even cheap methylated spirit (wood alcohol) are often used, despite the beneficent efforts of government authorities to render the latter unpalatable by the admixture of castor oil, pyridine and other nauseous substances. Thus, for example, in Glasgow there is a mixture known as " Red Lizzie," made of wood alcohol coloured with red wine from Lisbon, while in the slums of Leith a similar mixture is known locally as " Red Biddy." Liqueurs and heavy wines, such as port and sherry, are less frequently employed by the chronic drinker, while the still more dilute and delicate wines, whether of the hock or claret type, also ordinary beers, specially those of the post-war degree of dilution, are all of them too slow in their effects to attract and hold the assiduous alcoholist.

Chronic alcoholism in which the patient from day to day, over periods of months and years, consumes excessive quantities of alcohol, may for a long time pass unnoticed, especially in women patients, who have a special aptitude for concealing the evidences of their secret craving; the male alcoholist, on the other hand, yields to his failing more or less publicly, as a rule. The effects of alcohol show themselves in many organs and tissues of the body. The cardiac muscle undergoes fatty degeneration, chronic gastritis develops, with its characteristic morning nausea and vomiting; hepatic cirrhosis supervenes, with swelling and tenderness in the first instance, followed later by shrinkage of the liver, with accumulation of ascitic fluid in the abdominal cavity. Arteriosclerosis and chronic renal fibrosis are frequently present, but these conditions occur from so many other causes that it is sometimes difficult to regard the alcohol as more than an accessory factor in their production. The central nervous system shows changes, chiefly in its psychical functions. The patient becomes changed in character, irritable, excitable and quarrelsome. His powers of concentration fail, and he comes to depend more and more upon frequent doses of alcohol to enable him to carry out his daily occupation. He neglects his social and domestic responsibilities; he becomes increasingly indolent and inefficient, sometimes with moral delinquencies of various sorts. Epileptiform attacks may supervene, appearing suspiciously for the first time at or after middle life, and being specially frequent in patients whose habitual daily dosage has been rapidly reduced or withdrawn. The peripheral nervous system is often picked out, especially in female patients. The clinical picture of polyneuritis appears, including the characteristic drop-wrist and drop-foot, tenderness of the muscles of the calves and forearms, also hyperæsthesia of the soles of the feet. Cutaneous anæsthesia, of glove and sock distribution, may be present. The tendon-reflexes disappear. Female patients suffering from polyneuritis not uncommonly develop a characteristic psychosis known as Korsakow's psychosis, in which the patient becomes disoriented in time and space, so that, although bedridden from polyneuritis, she recounts in detail pseudo-memories of her alleged walking expeditions in the immediate past, it being within the knowledge of her entourage that these incidents are entirely imaginary. (It should be remembered that a similar psychosis occurs in other non-alcoholic forms of polyneuritis, e.g. from arsenical or diabetic polyneuritis.) Even in the absence of polyneuritis, irregular tremors of the limbs and tongue show themselves in the chronic alcoholist, temporarily controlled by an extra dose of alcohol. Quinquaud's finger-crepitation test is a useful diagnostic sign. It is elicited by getting the patient to spread out the fingers of one hand and press their tips firmly against the palm of the observer's hand, held vertically upright. After a few seconds the fingers are felt to have a curious crackling crepitation, as if the phalanges were rapidly pressing, one behind the other, towards the observer's palm. Rarer clinical manifestations of chronic alcoholism need not be described in full, e.g. the occasional occurrence of retrobulbar optic neuritis, especially in the combination of tobacco plus alcohol-poisoning.

Dipsomania consists in recurrent bouts of acute alcoholic intoxication. It must be clearly differentiated from chronic alcoholic soaking. It is sometimes a symptom of uninhibited obsession occurring in a psychasthenic individual. The diagnosis of this psychasthenic type of dipsomania depends on the characteristic history of the case, together with symptoms presented by the patient at a period when he is free from alcoholic influence. Such individuals often show a tendency to other obsessions; moreover, they are free from the ordinary signs and symptoms of chronic alcoholism and in the intervals between their bouts they have phases of abstention or even of positive repugnance. Other cases of dipsomania are examples of manic-depressive psychosis, especially of its milder degree, known as cyclothymia. In such patients the phases of emotional depression induce outbursts of acute alcoholic excess, each preceded by premonitory restlessness, so that the patient can often foretell his impending attack. Unless suitably treated, this impulse becomes uncontrollable, and he strives to drown his sorrow by some form of alcohol, the stronger the better. The dipsomaniacal bout, which lasts for several days, sometimes a week or two, culminates in an attack of alcoholic gastritis with nausea and vomiting, after which the patient recovers, ashamed and repentant, until after an interval of weeks or months he relapses into a fresh outburst. Another variety of dipsomania is met with in paralytic dementia. In such cases the diagnosis is readily established by recognizing the ordinary physical signs of the disease, especially the pupillary changes, the facial or lingual tremors, and most constantly of all, the syphilitic reactions in the cerebrospinal fluid.

Delirium tremens is an acute toxic psychosis which occurs most commonly as a result of sudden withdrawal of alcohol in a chronic alcoholist with a high degree of tolerance, when for some reason or another he is accidentally deprived of his daily dose, e.g. during confinement in a prison-cell, during compulsory confinement to bed owing to some febrile disease (especially pneumonia), or to some surgical trauma such as a fractured limb. Much less frequently does it occur as the climax of chronic and prolonged heavy drinking. The symptoms of delirium tremens begin with loss of appetite, coarse tremors of the limbs, physical and mental restlessness, hasty voluntary movements. The patient has difficulty in falling asleep, and suffers from terrifying dreams. He soon becomes completely insomniac. The tremors and restlessness rapidly increase in severity, followed by characteristic visual hallucinations and illusions, usually in the form of animals, such as spiders, rats and monkeys (zoopsia), causing the patient acute emotional distress. A useful clinical test to demonstrate the presence of these visual hallucinations in their earliest stages, is to hold in front of the patient a blank sheet of white paper and ask him what he sees on it. He describes animals of various sorts, or may read aloud imaginary messages, a condition which is practically pathognomonic of alcoholic hallucinations. The appetite completely disappears, the pulse rises to 100 or 150, and there is often a mild pyrexia, even in the absence of pulmonary complications; there is also a temporary polynuclear leucocytosis in the blood. The delirious alcoholic patient is relatively insensitive to pain. Thus he may continue to move a limb which has been fractured, and pneumonia may escape observation owing to the absence of the usual sharp stabbing inspiratory thoracic pain. He sweats profusely. The urine is scanty and often albuminous. In many cases there is incontinence of the bladder and rectum; retention of urine is rare. Within two or three days the delirium reaches its maximum, lasting from three to six days, and terminating by a critical sleep of six to twelve hours, from which the patient wakes up, mentally clear, with normal pulse and temperature, and free from tremors. In unfavourable cases the pulse becomes progressively faster and feebler, the temperature rises, and the patient dies from collapse and cardiac failure. It is an unfavourable sign if the pulse and temperature remain high after the critical sleep has occurred.

THE TREATMENT OF ALCOHOLISM

Considerations of space preclude a detailed discussion of the various available methods of treatment. It will, however, be readily understood that chronic alcoholism, dipsomania and delirium tremens are entirely different syndromes, demanding different methods of treatment.

For the treatment of *chronic alcoholism* systematic institutional treatment, under regular medical supervision, is essential. So-called remedies advertised to be introduced into the patient's diet without his knowledge, are futile. Co-operation by the patient should be secured. In cases in which the patient obstinately refuses treatment he can sometimes be placed compulsorily in an inebriates' home by an order of Court, but only if he has previously been publicly convicted of alcoholism, so as to bring him within the scope of the law. One of the most efficient methods is the atropine and strychnine treatment, of which the main outlines are as follows:

The daily ration of alcohol is not abruptly cut off, but is rapidly tapered, day by day, until at the end of a week it is completely withdrawn. This is in order to avoid risk of delirium tremens. After a brisk initial purge, the patient is placed on a mixture containing atropine, strychnine, cinchona, gentian and capsicum, five times a day, supplemented by hypodermic injections of atropine and strychnine, three times a day, according to a regular programme. The maximum dosage is reached at the end of the second week; this is maintained until the end of the third week, after which a gradual progressive reduction is made, week by week, until at the end of the sixth week drugs are withdrawn. Meanwhile general massage and exercises, together with suitable psychotherapy, are carried out with the object not only of restoring the patient to an alcohol-free life but of endeavouring to create in him a pride in his own cure.

The treatment of *dipsomania* varies according to the stage at which the patient comes under medical care. If the attack is already established and he is drinking hard it can usually be cut short by giving hypodermically an emeticdose (1/10 grain) of apomorphine. This precipitates the gastric crisis and produces acute vomiting, followed by profound sleep, generally lasting from three to eight hours. The patient wakes up free from the craving. We then administer smaller doses of apomorphine (1/40 to 1/30 grain) for three to four hours, to maintain a mild hypnotic effect. If the dipsomaniac is caught during the premonitory restless stage, when his alcoholic craving has begun, but he has not yet given way to it, again apomorphine is of great value. An emetic dose is not necessary. All that is required is a small dose (1/40 to 1/30 grain), which produces faint nausea, followed by several hours' sleep. When the patient wakes this dose may be repeated. During the inter-paroxysmal period psycho-therapeutic suggestions are of great value, especially by deep hypnosis, whereby distaste for alcohol is induced. Such individuals should become permanent abstainers.

The treatment of *delirium tremens*, once it is established, consists in calming the patient's emotional excitement and procuring sleep. He should be in a room by himself, with tactful, kind and muscular attendants. A preliminary hot bath as a sedative should be employed whenever available. Failing this, a good substitute is a cold pack, the patient being wrapped in a large sheet wrung out of cold water and enveloped in several layers of thick blankets. He is kept in bed and fed on liquid foods, such as beef-tea, milk and strong soups. Sleep is essential and should be induced by some quickly-acting hypnotic, e.g. veronal sodium 10 grains by the mouth, or somnifen 2 c.cm. by intramuscular injection, or by a mixture containing chloral hydrate, potassium bromide and tinct. hyoscyami. In cases with wild motor excitement, hyoscine hydrobromide, 1/50 to 1/100 grain, may be given hypodermically. Mechanical restraint should be avoided as much as possible. A tactful woman nurse usually succeeds in controlling the patient, but she should have the assistance of a strong male attendant in case of emergencies. If the patient is violently excited and constantly struggling to get out of bed, a good method of restraining him is by means of a long folded sheet placed across his waist between the blankets, including both the patient and the bedstead, and firmly tied beneath the bed. Alcohol should be withheld when delirium tremens has actually supervened. If the heart threatens to fail, caffeine sodio-benzoate 4 grains, or coramine 1 c.cm., or strychnine hydrochloride 1/30 grain should be given hypodermically. The chest must be carefully examined from day to day, to watch for threatened pneumonic complications.

ACUTE ALCOHOLIC POISONING

This is a condition in which the individual, whether spontaneously or during some special social celebration, consumes an excessive quantity of alcohol within a few hours or less. Such an individual is not necessarily a chronic alcoholist; he may be habitually temperate in his habits. As a matter of fact, the young and experienced drinker, who has acquired a tolerance, i.e. a power of oxidising the drug and whose tissues are so well provided with alcohol antibodies that he can drink his inexperienced fellow-guest under the table without suffering himself from noticeable physical or psychical disturbances. Individuals with old brain-injuries associated with cerebral concusion are specially vulnerable, for months or years afterwards, to small doses of alcohol, so that they become acutely intoxicated on slight exposure to the drug.

The symptoms of acute alcohol-poisoning vary from one person to another, affecting different parts of the central nervous system with varying intensity, according to each individual's vulnerability. During the early stage of excitement with deficiency of inhibition, from affection of the psychomotor cortex, some individuals become humorous and hilarious, others are sleepy, others become gloomy and quarrelsome, and even maniacally violent. A useful sign of cortical poisoning is the impairment of time-sense, so that the intoxicated person, when asked the time of day or night as the case may be, is often widely inaccurate. If the cerebellum bears the brunt of the poisoning, his gait becomes reeling and unsteady, with difficulty in walking along a straight and narrow path, together with widespread muscular hypotonia. If the vestibular apparatus and its mid-brain nuclei are involved, giddiness supervenes, sometimes moderate in degree, in other cases so severe that the patient lies helpless on the ground, acutely conscious of his condition, but unable to raise his head or trunk without violent vertigo, causing him to collapse helplessly on the floor. Lesser degrees of inco-ordination may be brought to light by a sudden change of posture. Many a guest realizes that he has dined not wisely but too well only when the moment comes for him to rise and leave the festal board. A sudden fall in atmospheric temperature may also precipitate intoxication. Many a man hesitates to leave his host's fireside without an escort, owing to vivid memories of open-air tragedies. Other familiar signs of poisoning are due to disorder of the ponto-medullary motor nuclei and their cortico-bulbar paths, causing diplopia from paresis of the external ocular muscles and dysarthria from implication of the bulbar centres controlling articulation. The patient's articulation, especially of consonants, is therefore indistinct, when he tries to pronounce test sentences (which, of course, should comprise words of his own vocabulary and not elocutionary tongue-twisters). Superadded cortical dysphasia may also cause him to misplace or to omit a syllable, here and there. The condition of the pupils is not always the same. They may be normal or dilated. Dilatation of the pupils, with sluggish reaction to light, a symptom on which considerable diagnostic importance has been laid by some observers, is, in my experience, only of accessory value, since it may be produced by many other conditions, including that of emotional excitement. Dilated insensitive pupils, on the other hand, occur in the stage of profound alcoholic stupor, in which no diagnostic difficulty occurs.

The diagnosis of acute alcoholic intoxication is established not by the presence or absence of any single physical sign, but by a consideration of the behaviour and reactions, taken as a whole. In a well-marked case the aspect of the face is striking; it is flushed and suffused, the pulse is rapid, the skin is warm and sweating. Hiccup, salivation and even vomiting may occur. The smell of alcohol in the breath is suggestive, but by itself is of no value for establishing a diagnosis of intoxication. On the other hand, when there is no smell of alcohol in the breath, this is a valuable contrary diagnostic sign. A correct conclusion can only be arrived at when, in addition to an alcoholic breath and emotional excitement, incoherence of thought, indistinctness of speech and handwriting from cortical intoxication, are found, together with signs of temporary cerebellar and ponto-bulbar disorders. These latter are shown by unsteadiness of gait, especially when turning sharply, sitting down and rising again; also by difficulty in performing fine co-ordinated movements, such as pointing to or picking up a small object, e.g. a pencil or coin, from the floor. True dysarthria, known to be different from the sufferer's ordinary articulation, also diplopia, if it can be demonstrated, are definite evidences of central nervous disorder.

Estimation of the alcohol-content in the blood is a valuable accessory test, when available. Such examinations have been carried out systematically on a large scale in Sweden for several years by co-operation between police authorities and hospital laboratories.

A few drops of blood are collected in a capillary pipette. The contents are subsequently weighed, distilled with potassium bichromate and sulphuric acid and then titrated with sodium-thiosulphate and potassium iodide, using starch as an indicator. The sudden disappearance of an intense blue colour is the index of a complete reaction. A blood-alcohol percentage of 0·25 denotes drunkenness, 0·15 indicates moderate intoxication, while percentages of 0·10 and thereabouts provide the cases in which it is difficult to decide whether or not the man is, " under the influence."

The minimum percentage which gave rise to such a condition has been noted at 0·088.

It still remains to be seen what degree of alcohol concentration in the blood will be accepted in a court of law as evidence of intoxication, since it is the quantity of alcohol in the central nervous system and not in the blood which is the efficient factor in inducing intoxication. Experimental evidence has shown that a simple ratio exists between the alcohol concentration in the urine and that of the blood at the corresponding time, the concentration in the urine being 35 per cent. higher (i.e. 1·35 : 1). The presence of alcohol in the urine only shows that the patient has had alcohol which is being eliminated by the kidneys.

The presence of alcohol in the cerebrospinal fluid is conclusive positive evidence of central brain-poisoning but is rarely available, save in conditions of alcoholic stupor.

The *treatment* of acute alcoholic poisoning consists in removing from the stomach as much of the alcohol as has not already been absorbed and controlling the patient until the remainder has been eliminated from the blood by the kidneys and lungs.

If the patient is in the stage of excitement, incoherence, motor restlessness or ataxia, an emetic dose of apomorphine (1/10 gr. hypodermically) should be given and the patient allowed to sleep off his debauch. If the patient is already stuporose, the stomach should be emptied without delay through a soft stomach-tube. Emetics like apomorphine may produce dangerous cardiac depression and are therefore inferior to gastric lavage with warm water. When the stomach has been completely emptied, and before the stomach-tube is withdrawn, half-a-pint of hot coffee is introduced, together with a saline aperient such as 120 grains of magnesium sulphate with 20 minims of dilute sulphuric acid in 2 oz. of peppermint water. If there is collapse, strychnine in full doses (1/30 gr. every four hours) should be given hypodermically and if there is respiratory failure, artificial respiration may be required. The patient is then allowed to sleep quietly, keeping him warmly wrapped up. Next day, when he wakes up with symptoms of "the morning after the night before," the headache can be alleviated by effervescent caffeine citrate 120 grains, while the beneficial effect of the saline aperient will also be helpful.

SEXUAL PERVERSIONS

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LITTLE enough sympathy is given to sufferers from any form of mental illness; these disorders have been so obscure and so little understood that not even medical men have taken adequate notice of them. The sexual disorders, and more especially the perversions of the sexual instinct, constitute a group of illnesses to which this is even more applicable and they have hardly been recognized as curable sickness. Men and women qualifying in medicine, with no more instruction in the subject than any layman, have too often regarded those who suffer in this way as either freaks—if the condition is mild—or as monsters, and have been content to leave it at that. Krafft-Ebing and Havelock Ellis, though both lacking insight into the underlying psychological mechanisms, wrote classical descriptions of these conditions. They have interested and perhaps amused many people, and have revolted, shocked or puzzled others. Neither repulsion nor moralizing does anything, however, to help the individual who suffers from a sexual deviation or to solve the social problem which is created by these abnormalities.

The greater the practitioner's experience and maturity the more is he taken into the confidence of his patients on matters concerning sex. Many have been surprised to find how relatively frequent some form or degree of perverted interest is, in people who are to outward appearance very normal. No statistics can be produced to indicate the frequency of such troubles, but they are sufficiently common to merit the interest of every practitioner doing clinical work. Their pathology is often difficult and obscure, and in consequence the treatment of fully-established abnormalities is far from easy. It is certainly in psychopathology that the explanation of these conditions lies for, although constitution and physiological abnormalities may be contributory, there is no good evidence that they are casually responsible for the development of perversions.

NORMAL SEX FUNCTION

In order to understand sexual deviations it is necessary to have some knowledge of the normal sex function. There is a popular idea that sexuality only commences to develop at puberty; this is not so. At puberty, when the so-called secondary sex characteristics begin to develop, the sex function begins to take on what is eventually going to be its adult form, but the nucleus of the sexuality has been present from the beginning. Just as in the infant, there is the beginning of the physiological adult, so here, too, is the germ of the future adult sexuality, though at this early stage it is undifferentiated. The term " infantile sexuality " is often used nowadays and by this must be understood not a perverted morbid manifestation of the sexual life, but something which is perfectly normal and common to every individual.

The physical sex parts are obviously differentiated at birth, but the specifically male and female characteristics of the individual do not begin to develop till much later. About the sixth or seventh year of life the boy becomes more definitely " boyish " in his interests and outlook, and the girl child begins to show more feminine interests. This differentiation which is now both physical and emotional is carried a stage further at puberty. In infancy, it is through the sense of touch, i.e. by physical contact, that the infant first gets into relationship with the world outside itself; the mouth is a very important medium for such experiences. In connection with the process of nutrition the rhythmic activity of sucking is employed, and if a normal infant is watched at the breast it is easy to recognize that the satisfaction of hunger is obviously a pleasant process. The child is soon found reproducing the sucking process apart from the feeding activity, because it thereby achieves a pleasant comforting sensation. Equally commonly it is observed that digital stimulation of the genitalia is also pleasant. As development proceeds, the areas of the body which are associated with erotic sensation, which is ultimately to become specifically sexual in the adult, are gradually differentiated, but from what has been said, it can be understood that at the beginning the germ of the future sexuality was indistinguishable from the general bodily sensations of the infant.

It can be understood that self-directed interest has been present in the individual from the earliest weeks of life. The child is observed to be pre-occupied with its own body, and later interested and curious about its excreta, the anatomical differences between boy and girl, the origins of the " new baby " and so forth. It cannot be too strongly emphasized that this curiosity about the body and its functions is normal and a valuable mental asset from which is derived the child's impulse to widen its circle of experience and " find out about things." Curiosity and interest in sexual matters therefore constitute a factor to be recognized and provided for in the upbringing of every child. In fact the absence of sex-interest or curiosity in the child is a more or less morbid condition, indicating that there must have been some arrest in normal development. The healthy frankness of the child has been checked and " driven underground," so to speak, by the prudish attitude and shocked manner of the mother or nurse.

PHASES OF SEXUAL INTEREST

Normally, sexual interest appears to manifest itself in three stages:—

(1) The first phase, which lasts roughly till the fourth or fifth year is essentially "narcissistic" in character. This designation, derived from the classical legend of Narcissus (who fell in love with his own reflection) indicates that the interest and pre-occupations of the child are with himself. He is intensely interested in his own body and its functions, his origins and so forth; he has in fact realized himself as an object to be loved. This is the age of outspoken comment and frank questions, which in the interests of the child's future psycho-sexual development must be taken seriously and answered truthfully. There must be neither snubbing nor evasions.

(2) The second or latent period lasts up till the onset of puberty. During this phase, the early sex curiosity having been satisfied, the matter sinks into the background.

(3) The third phase of sex interest roughly coincides with puberty and normally remains more or less constant throughout adolescence and adult sexual life. The development of the secondary sex characteristics, both emotional and physical, brings the whole problem much nearer home, the dawning of sexual self-consciousness in the adolescent makes it all a much more personal matter. At this phase, too, the capacity for "object love," i.e. a love-object apart from the self, develops.

The normal sex-function has for its ultimate purpose the mutual attraction of the sexes, in order to achieve physical union and the impregnation of the female for the purpose of producing offspring. In this process, the senses play an important part, particularly those of sight and touch, and there are certain erotogenic zones of the body in the adult, capable of excitation and endowed with a quality of sensation which is specifically sexual. In the normal sex act the male takes the initiative and plays the active part, whereas the female role is more passive and receptive. Normally there is a definite sexual aim (coitus) which is directed toward a definite sexual object—the mate.

ABNORMAL CONDITIONS

Even with this sketchy outline of what may be considered normal, it should be easier to understand how faults in development may lead to abnormal conditions. Owing to parental mishandling there may be over-emphasis on any of the earlier phases of interest—oral or excretory. A sense of being thwarted and a feeling of guilt may develop, and persist in the child's mind, to re-appear later on in some pathological form. A sexual perversion is the name given to any condition in which there is any gross abnormality of that function. This may be first *in relation to the sexual object.* (a) In the case of sexual inversion or homo-sexuality, where the " object " is a member of the same sex. (b) When the object is a sexually immature individual. (c) When the object is an animal of a different species (pederasty). Secondly, *the sexual impulse may be perverted in relation to the sexual aim :* (a) *Fetichism,* in which the sexual object is replaced by another which is normally non-sexual. The substitute may be a part of the body or an inanimate object. Such a condition of affairs is usually brought about by some sexual experience in childhood, and is often of the nature of a conditioned reflex. (b) When another aim is substituted. (i) *Travsvestitism,* in which sexual satisfaction is associated with wearing the clothes of the opposite sex. (ii) *Exhibitionism,* in which sexual satisfaction is associated with the display of the genitals.

MASTURBATION

There are some pathological manifestations of the sexual instinct which are so common in incidence as to be almost " normal," although they are sometimes carelessly called perversions. Of these the commonest is masturbation. This is always a symptom of some neurotic disturbance, which usually clears up when the real cause of the trouble is dealt with. The tendency to produce pleasant bodily sensations by self-imagination or manipulation is, as already seen, a characteristic of infancy, e.g. the child who sucks his thumb, when deprived of his bottle. Similarly, if the child is " bored " he tends to seek for diversion elsewhere, and in his own body. Masturbation is frequently found occurring in the child who is sent to bed without anything to do; either as a punishment, or for a " rest " long after he has outgrown the need for one. Less obvious causes for masturbation in older children are to be found in cases in which a sensitive child is rebuffed or discouraged by the circumstances of his life or environment, when he " regresses " to a mode of consolation characteristic of infancy, but which normally he should have outgrown. In such a case the important thing is to discover why the child should feel so inadequate in the face of his circumstances and the demands of life as to be unable to relinquish the old-time childish mode of consolation. Whether the individual is a child or an adult, the underlying causative mechanism is the same. The symptom may be carried on uninterrupted from early childhood or it may appear at one or other of the critical periods in the psycho-sexual (emotional) life of the individual, such as puberty or a crisis in the love life, when the challenge of reality is such that the individual feels inadequate to face it, and retreats, short-circuiting his interest. A great deal of mischievous nonsense has been talked about masturbation. The habit itself does no permanent harm, but the guilt and anxiety so frequently met with in sufferers from masturbation, the result of ignorant public opinion, inaccurate knowledge, and false religious views, often produce a very serious degree of emotional tension and mental conflict.

Another very common abnormality is to be found in activities of the " Peeping Tom " type. The voyeur, or observationist, is a man who gets his chief satisfaction from looking at the bodies of women or their clothing. Here the value of the visual factor in sexual stimulation is greatly exaggerated at the expense of other more important components. In practically every such case there will be found to have been an early repression of normal curiosity in childhood.

What may also be found as a comparatively normal condition is the slight exaggeration of the normal masculine assertive tendency or of passive feminity, which may be called *sadism* or *masochism.* The word sadism really should be kept for those conditions in which sexual pleasure is derived from the infliction of cruelty, and masochism is the converse state. When these conditions are fully developed they are in fact perversions and their origin will always be found in very early infantile experiences. Neither of these conditions is limited to one sex and perhaps the commonest and most puzzling situation which arises is that of the masculine masochist. With considerable frequency adolescent or adult men are found who have constant interest in flagellation and torture, and may make almost elaborate phantasies of such activities and may tie themselves up in a number of different ways. The tendency to self-abasement may spread far beyond the confines of physical sexuality and may affect a man's ability to hold his job or adapt to any of the social circumstances of his life.

HOMOSEXUALITY

Similarily, it should be recognized that homosexuality in its milder forms in adolescence can hardly be called a perversion, for it is a normal phase in the psycho-sexual development. The attractions and friendships of adolescents for those of their own sex constitute an important part of the experience necessary for them. The development of essentially masculine or essentially feminine characteristics is furthered by these relationships, though they may of course, especially in boarding schools, be difficult and perhaps become more serious than they should. The normal adolescent whose circumstances are helpful tends to move on towards heterosexual interest at about the seventeenth year. The persistence of homosexuality after that time should be considered as abnormal and undesirable as it always means an arrest in emotional development, whether the slight deviations or the more serious ones, normally called inversion, are considered. Falling in love is a complementary process, the masculine man finds completion with the feminine woman; he who is less masculine, or actually effeminate, will tend to look for someone of his own sex as his complement.

There is more reason to suppose that constitutional and physiological factors play a part in the persistence and development of homosexuality than in any other of the sexual perversions. The psychopathology of all the perversions is complex. It is by no means always necessary to go back to infantile difficulties to understand them, and sometimes they can be cured without any such step being taken. It can, however, be taken as established that the real causation does lie in traumatic experiences in very early life, which affect the subsequent development of the sexuality.

FETICHISM

In cases of fetichism there is an element of obsessional compulsion. The sexual impulse is aroused in such patients by an object which is normally non-sexual, as for example shoes, kid gloves, a silk scarf, or any other object.

A patient whose fetich was gloves, although he occupied a position of importance in a city office, would quite frequently be late at his work, or even absent for most of the day, because having seen on his way to the office a bus driver wearing a particular kind of glove which interested him, he had to go with the bus to its destination in order to have a chance of talking to the driver and if possible touching his gloves; and at times, not finding this opportunity, would have to go on travelling to and fro with the bus all day long! Mental analysis showed that there were many different factors at work, and it was interesting to discover that this man's first recollection of any sexual feeling was associated with gloves. When a tiny boy he was out with his nurse, to whom he was unduly attached: she, in the park, was met by a guardsman who gave her most cordial embraces. At the same time he fondled the small boy, and he was wearing white kid gloves.

In an article of this length it is not possible even to enumerate all the various forms of perversion and certainly not to give illustrative examples. Many practitioners can supply these from their own experience with patients. The main concern here is with the general attitude which the doctor should take up towards these conditions. The individual who has a sexual perversion is suffering from a psychoneurosis comparable in every way with the anxiety states, hysterias, or the obsessional neuroses. The perversion itself is one symptom of emotional disturbance, and when it is a major symptom may be of such a nature as to bring the sufferer into conflict with the existing social code. Those who have sexual deviations must be regarded with precisely the same tolerance and interest with which any other patient with any other serious and incapacitating symptom is regarded.

PREVENTION

As with every group of disorders in medicine, it is always necessary to look for methods of prevention. The elimination of neurotic difficulties from those who are to be parents will certainly assure wiser handling of infants and small children, and so contribute to normal sexual development. Better education in the meaning, importance and normality of sex is already producing results which must have value in the prophylaxis of these conditions, while the modern attitude towards sexual matters—that swing of the pendulum from Victorianism, which is not an unmixed blessing—has this great advantage that attention will be called earlier to the development of the abnormal interests in children. The future outlook on the sexual perversions is therefore fully as encouraging as the hopes for the prophylaxis and treatment of any group of physical developmental difficulties.

TREATMENT

Treatment of the sexual perversions is usually made much more difficult because they have not been recognized as such, nor have the individuals sought treatment, sufficiently early. In considering prognosis, the age of the patient, the length of time the symptoms have existed, his intelligence and his anxiety to recover must all of them be taken into account. The individual whose symptoms have brought him into conflict with the Law and who is referred for treatment by the Courts, or by a Probation Officer, is far more difficult to treat than the patient who comes on his own initiative. Treatment is regarded by the former group as being suspiciously like a part of their punishment and is correspondingly resented. Reassurance and sympathy from the doctor will help any of these patients, and a greater understanding in the patient's family, which removes much of his difficulty and sense of gross abnormality, can often be ensured. Psychotherapy can show very good results in the treatment of sexual perversions, more particularly in younger people. Mental analysis in some form or other is always the treatment of choice, and in the majority of cases a deep reductive analysis is necessary if a radical and permanent cure is to be achieved.

GENERAL PRACTICE*

NO. I.—PREPARATION FOR PRACTICE

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PREPARATION for practice should begin long before qualification, for general practice does not only connote a dealing with the sick but also, and to a large extent, the dealing with healthy people. For instance, the matter of a patient's relatives or friends is worthy of consideration, for it may and will at times overshadow the illness about which these satellites revolve. The subject is inexhaustible. The more distant the relationship, the more doubtful the friendship, the more is the doctor worried for further and yet further information on the disease in question. A peculiar combination of horror and ghoulish anticipation can be noted in certain women inquiring about the health of their elderly aunts (particularly if rich).

RELATIVES OF THE PATIENT

The following are a few of the trials to which the doctor is subjected by relatives :

(1) He is stopped at various stages of his descent from bedroom to front door by members of the family to repeat all that he has already told the patient.

(2) Removal of patient from a sanatorium to which he has been admitted by the doctor's efforts, on the grounds that they are sure the patient will be depressed, or catch the disease in a worse form from others.

(3) Calling in a consultant and fixing the time of the consultation (usually Sunday afternoon) before mentioning the matter to the general practitioner. I hasten to add that the consultant is not always to blame. He has probably been told that the doctor

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* This is the first of a series of articles to be published under this title. Next month Dr. I. G. Briggs will write on "Choosing a Practice."

has requested the family to fix up the meeting.

(4) Deliberately attempting to create discord between fellow practitioners. In all fairness I must say that this is not common, but the following experience is sufficiently remarkable to justify description:

Scene: A small house, of which the windows had been tightly closed for many years. Occupants: Mother, deserted by husband, confined to her room ever since—a *malade imaginaire*, except for hæmorrhoids, of which she never tired of supplying revolting details—and sick daughter of 20 (the patient), whose life had been spent tending to her mother's sole physical disability. Two other air-and-sun-starved daughters suffering from the tyranny of mother also present together with several cats and dogs. To this I was called to examine the daughter, who, I was told, had no doctor in the town. The patient was a thin, whining, bloodless creature with signs of tuberculous mesenteric glands. Having given the diagnosis, I was asked whether I was sure the case was not one of appendicitis. To this I replied in the affirmative. I was then informed that another local practitioner had been in attendance, and was, in fact, shut up in one of the other rooms of the house so that I should not meet him and be influenced in my judgment! Not only that, but a surgeon from a neighbouring town was likewise confined to yet another room. He was in disgrace because, having been sent for with a query of appendicitis, he had dared to bring a bag of instruments. This showed that he had made up his mind to operate before seeing the patient! Before all this was revealed to me I was asked to telephone for a London consulting surgeon, who was on holiday in the town, but mother sat by the telephone to prevent any attempt at mentioning an opinion on diagnosis. I left soon after this, but heard that he went through the same process, and the various semi-asphyxiated doctors met eventually outside in the street! Fortunately we possessed a sense of humour, and I am beginning to suspect that the old woman did also.

(5) Unjustifiable curiosity. It may seem incredible, but it has occurred to me and many others who have had an experience of general practice to be accosted by inquisitive old ladies, probably in no way directly interested in the house one has visited, with the question: "Doctor, what exactly is the matter with Mrs. So-and-So?" Now when a practitioner is attempting to build a reputation for himself in a small town he is torn between the desire to tell such a woman to mind her own business, and the wish to be polite lest she pass it round the town that the doctor's manners are not becoming to his profession. In early days I advise hedging on the matter, pointing

out that, although a doctor is debarred from answering such questions, yet it is certain that, as she is such a great friend of the family, they will be only too pleased to give her full details should she care to call. Later, when established, I think this is one of the rare occasions when rudeness is justified.

(6) Gossiping. The greatest curse of small towns is the wagging tongues at bridge parties. The doctor, the curate and "blood pressure" were the popular topics when I was in practice, but no doubt the theme varies slightly from year to year. The most extravagant statements are made about the wretched recipient of the party's interest. Usually starting with the suggestion of somebody's death being the result of the doctor's carelessness, the afternoon rarely finishes without veiled references to moral deviations which so shock and yet delight these wilted relics of Victorian inhibitions. If the victim can obtain sufficient proof of slander he should not hesitate to claim heavy damages. He will get them, and teach the prurient-minded gossips a salutary lesson.

(7) Using the doctor's authority for nefarious ends. One may forbid visitors to a very sick patient, and a resident daughter may employ this veto to prevent access of equally close relations. In the meantime she induces the semi-responsible invalid to make out a will entirely in her favour.

NEED FOR BROAD OUTLOOK

The question may be raised, "What has all this to do with *preparation* for general practice?" The answer is that these examples are given merely as a small indication of the side-lines of medicine which can only be tackled satisfactorily when the doctor has a fair knowledge of people as opposed to disease. The great drawback of medical training is that it tends to isolate students from all other interests, and thus to limit their outlook at the very age when it should be constantly broadened by extensive and catholic contacts. As a student therefore the tendency to gravitate always towards fellow medicos not only during term time but also during holidays should be strenuously avoided. The friendship of students of other faculties should be cultivated, and social life should as far as possible be away from a medical atmosphere. As a profession we have a bad reputation as dull guests entirely because of the single track on which our minds tend to run.

THE STUDENT AND HOSPITAL APPOINTMENTS

Which are the most valuable specialties for the senior student to study? How can his time be spent best in preparation for general practice? It would be trite to point out that the more knowledge of medicine acquired the more efficient will the qualified practitioner be. However, to obtain all special appointments is possible only for the very few; others, whose financial resources press for early qualification, must single out the most useful, and a choice must be made of those specialties which are encountered most frequently in general practice, and particularly those which are regarded by the laity as obviously part of the doctor's routine work. He must be influenced also by the degree of overlap of general medicine, or surgery, and the particular specialty in mind. For instance, genito-urinary diseases are constantly encountered in the medical and surgical wards, and it is unlikely therefore that the practitioner will feel hopelessly at sea if he be faced with a case of this category. The study of orthopædics is similarly placed, and in both cases general training should render it feasible to form an opinion of the system at fault even if accurate diagnosis be impossible. In neither example will the patient feel justified in assuming incompetence if the aid of a specialist be advised.

That most difficult, time-absorbing and fascinating specialty, neurology, is a thing apart. Although on the face of it, it would appear to be desirable to study fully the diseases of the nervous system, yet to those who are pressed for time, and to those only, its omission is advised for the following reasons: (1) Apart from cerebral vascular disturbances, syphilis, paralysis agitans, epilepsy and possibly disseminated sclerosis (the first three being frequently encountered in the general wards and out-patients), diseases of the central nervous system are seldom met in the ordinary course of work. (Infectious diseases such as meningitis belong, of course, to the province of general medicine.) (2) Proficiency in neurology requires years of hard work, often to the exclusion of other aspects of medicine. (3) The practice of neurology is usually confined to accurate diagnosis; effective treatment is seldom available. The patient is interested in treatment, not in diagnosis. Whether the doctor has unravelled the case or not, therefore, his patient will very naturally demand the opinion of an expert. (4) The public as a whole realizes that neurology is a well-defined branch of medicine, and will not expect a general practitioner to be master of the subject.

Psychological medicine is of far greater importance to the general practitioner than organic neurology, because a patient's mental state obtrudes itself in association with all disease from whatever cause. Lack of appreciation of this fact has led to more failures in practice than any one other shortcoming. Suppressed anxiety is inimical to recovery and co-exists with the most trivial ailments.

Three specialties which must be studied are diseases of children; of the nose, throat and ear; and of the skin. The most important and the weakest link in the chain of family practice is the child. If the practitioner makes one error over its illness the entire household will leave him. Children are not regarded by the public as a specialty, and one is expected to know all about them and infant feeding. On no occasion, except when examining a young child, is a doctor subjected to such close scrutiny, not only from the mother but also from the nurse. These two will sum him up afterwards, and will rarely fail to detect any hesitancy in his mind with regard to diagnosis.

Extra study of the second of the essential specialties is advisable, in the first place because alarming emergencies are apt to arise, particularly in relation to the ear. Correct diagnosis, and the ability to institute appropriate treatment, may be the decisive factors in averting permanent disability, or even death. Even the knowledge of how to remove hard wax painlessly is not to be despised. Most of the work in " ears " consists of this. There are few tasks more irksome when the waiting-room is full of impatient patients. No doubt this accounts for the frequent encounter with a disgruntled case of deafness which has already been subjected to perfunctory syringing without relief. In early days it will be surprising to find that a dense plug of wax is still firmly wedged in the meatus, but in time it will be realized that many patients have never been examined before or after the aural lavage to determine (*a*) the cause of deafness, (*b*) the result of treatment.

The trouble about " skins " is that if the condition does not improve, the patient recognizes the fact as quickly as the doctor. Furthermore, everybody has a peculiar loathing for skin disease, and is intolerant of tardy recovery. A piece of advice given me by an old general practitioner was: " If the rash is dry use Lassar's paste; if moist, use aluminium acetate; if worse in three days get a specialist." I shall not comment on this, nor accept any responsibility.

Finally, no opportunity should be lost of assisting at ante-natal examinations and in cases of difficult delivery. Disorders of pregnancy in the widest sense are, contrary to the general belief, quite common. To be faced with a contracted pelvis, breech presentation and extended limbs is formidable to the expert.

To a man who has never so much as applied forceps it is a nightmare, differing therefrom only in the length of duration and often tragic termination. In the public's estimation blame is always to be attached to the doctor if the processes of child-birth go awry. He cannot refuse to take on midwifery in the majority of practices unless he is prepared to halve the practice, because with the baby goes the family. Nothing is easier to manage than straightforward parturition. Nothing demands greater promptitude of action than the complicated case.

PRESCRIPTIONS AND DISPENSING

A word about prescription writing will not be out of place here. Most newly-qualified men are quite unable to write a prescription, for they have been brought up on a hospital pharmacopœia containing stock mixtures. Necessary as these are for the running of a large pharmacy they also have the drawback of inducing forgetfulness of exact dosage and incompatibility. It is true that in England it is possible to carry on practice nowadays relying entirely on the proprietary preparations of reputable firms, but in some instances these prove to be excessively expensive for the patient. Serious incompatibilities can be learned in an hour and it is comforting to remember that if the worst comes to the worst, and a faulty prescription is made out, the chemist who dispenses is responsible for informing the doctor and correcting the error. Time will not be wasted in finding out from the hospital pharmacist the relative cost of the more commonly prescribed drugs. It is a surprise to most to discover how expensive are salicylate, bismuth and alcoholic preparations. The habit of dispensing medicines dwindled rapidly after the introduction of the National Health Insurance Scheme, whereby the panel doctor does not give prescriptions to his patients except in cases of emergency.

As a general rule it may be regarded as undesirable to combine dispensing with the usual work of general practice. If the doctor does it himself he will perforce adopt the simplest method, namely, the use of stock mixtures, and thus soon lose touch with the pharmacological principles which he is supposed to consider. To have to spend an hour or so in a dispensary preparing, labelling and wrapping up medicine bottles is too much of a strain on any man with a busy practice, and the fact that there is a serious increased responsibility should not be lost sight of. A partnership may keep a dispenser, or secretary-dispenser, and then the matter is quite different and often a good financial proposition. It must be remembered, however, that the principals may be held responsible for mistakes of the dispenser. It is questionable whether the time spent as a student learning practical pharmacy can in any way be justified in these days.

CHOICE OF HOUSE APPOINTMENTS AND HIGHER QUALIFICATIONS

The educational value of house appointments is so obvious as not to require stress. For the first time in the medical man's career, virtually full responsibility for patients' welfare is assumed. Because in any large teaching hospital the number of newly-qualified men is bound to exceed that of vacant appointments many will have to seek their experience elsewhere. In point of fact, this is a very good thing, for a post at a smaller provincial hospital usually embraces all aspects of medicine and thus gives a very fair picture of general practice. The same may be said of hospital out-patient departments. It is here that patients are seen for the first time and the value of symptomatology demonstrated. In general practice, as in the out-patient department, the doctor is expected to make a diagnosis on the spot. It is not always possible in either case, but that should be the aim. Clearly then, the educational value of out-patients greatly exceeds that of in-patients who have already been subjected to complex investigations which are seldom within ready access of the general practitioner.

Having held good house appointments such as H.S. or H.P. the newly-qualified man has a far better chance of being admitted to a worthy partnership than has the inexperienced man. The same, of course, applies to those holding higher qualifications. They have but little value *per se* in general practice, for the general public knows of only two, namely, M.D., and F.R.C.S. Such trifles as the M.S. pass unnoticed! That the higher qualifications should be obtained, if possible, is to be advised because (1) the necessary study implies increased experience in hospital; (2) they are essential for posts in all the larger provincial hospitals.

PERSONAL HEALTH. TRAVEL. LOCUM TENENS

Preparation for practice is by no means simply a matter of acquiring proficiency in medicine. A great strain is imposed upon the health of the general practitioner, even in the early stages as a junior partner. Not only is the mental fatigue induced by repeated introductions to new patients a very real one, but also the physical strain of the work is formidable. As a junior partner the practitioner may be expected to deal with some of the most fatiguing work in poorer districts, night calls and other exhausting activities. To plunge straight into this after the strain of house appointments and examinations is a serious mistake and should be avoided if at all possible. A post as a ship's doctor is an ideal preliminary to settling down in practice. It is the last chance of extensive travel, of mixing with every type of person and of readjusting the sense of proportion which becomes warped by intensive study. If no vacancy for a ship's surgeon is available then the longest holiday compatible with the customary small bank balance, or parents' means, should be taken.

Even before qualification, life and health insurance policies should be taken out. For a young man the premiums are small, the protection invaluable. Furthermore, a life policy can be used for raising money for the acquisition of a partnership.

To gain experience as a locum tenens is unquestionably of value, but this is, or should be, anything but a holiday if one has the interests of the principal at heart. After a real holiday, then, it is well worth while acting as locum tenens for a month in two or three practices, preferably country and town so that the relative advantages can be considered with a view to the future. By this time the future practitioner should be reasonably certain of himself as to his ability to deal with patients, as opposed to disease, with relatives and with fellow practitioners: he should also know whether country or town practice holds out the greater attraction. If, however, he has now decided that general practice appals him he would be well advised to seek work in the services. A general practitioner disliking his job will always fail.

MEDICAL JOURNALS AND SOCIETIES

As soon as qualification has been achieved the degree or diploma should be registered with the General Medical Council. It is equally essential to subscribe at once and for the rest of active life to a society designed to protect a doctor against the results of litigation. The cost is trivial; the protection immense.

A decision must now be made as to the nature and number of medical societies, associations and journals to which it is intended to subscribe. They should be chosen with an eye to the opportunity which they present for meeting fellow-practitioners, for using an up-to-date and efficiently managed library, and for reading sound medical literature. In the first place, the British Medical Association offers many real advantages to its members. Thus some degree of cohesion is secured between the doctors working in any district by virtue of the meetings which are held for the purpose of exchanging views on professional and political matters. The success of these branch meetings depends in part upon the activity and popularity of the local secretary, in part upon the degree of fraternal feeling between the individual members. The Association also attempts to represent the views of the majority of the profession when confronted with a threatened political interference with its interests. Whether it has always been successful is a matter on which opinions are sharply divergent but in fairness there must be recognized the difficulty inherent in attempting to please a great mass of men and women who demand a policy which shall satisfy their widely separated purposes.

The Royal Society of Medicine, which has resulted from the fusion of a large number of medical and surgical societies, offers unrivalled opportunities for clinical study in any branch of medicine, while the scope and efficiency of management of its library are astounding for their completeness.

It would be invidious to mention the name of any particular journal, but advice on this matter is easily obtained from senior colleagues.

METHODS OF SECURING AN INTRODUCTION TO A PRACTICE

(1) *General agencies.*—Of these there are many; the majority merely make contact between the would-be general practitioner and an established firm, but cannot supply any reliable information about either party. In such cases the fees charged by an agency may be excessive, the partnership having to pay not only a proportion of the original share price, but also further sums as fresh increments of shares are purchased.

(2) *Hospital agencies.*—These are more satisfactory, because an agency such as exists in most medical schools can not only supply authentic information about applicants, but also usually possesses useful knowledge about the members of the desired partnership. Further-

more, the introduction costs are fair and reasonable.

(3) *Casual communications.*—By this is meant the hitherto dominant method of introduction, namely, through a member of the hospital staff who has been asked to recommend some suitable man to a practice with which he comes in contact. Naturally a personal recommendation goes a long way towards securing a job, and a further advantage lies in the introducer knowing the strong and weak points of both partnership and applicant.

(4) *Advertisement.*—Offers for sale of practices, or partnership shares, appear in the leading weekly medical journals, but the greatest care is then needed, before the doctor commits himself to the proposed purchase, to obtain outside, unbiased, information about the practice in question.

CONCLUSION

In conclusion it may be said that general practice is the most fascinating branch of all medical work, not only because every subject belongs to its devotees, but more because of the unrivalled opportunity of close contact with, and study of, human beings apart from their diseases. Friendship with those in the most diverse walks of life is of itself an education denied to those in consulting work. The majority of fellow practitioners and patients are a joy to meet, and the work itself is unquestionably fascinating. Anyone who decries general practice as a bore is either ignorant of the subject, or has been too blind to recognize the interesting diseases, though present in profusion.

The general practitioner is assured of an adequate livelihood, can take holidays without fear of heavy financial loss, and, when the time comes to die, even this episode can be viewed with comparative equanimity by virtue of the capital value of his share in the practice added to that of his insurance policy. Thus are his dependants enabled to witness his exitus with some degree of stoical resignation.

PRACTICAL NOTES

TREATMENT OF NUTRITIONAL ANÆMIA OF INFANTS

Nutritional anæmia of infants can be prevented by assuring an adequate supply of iron both to the mother during pregnancy and to the infant during the period of lactation. According to L. Parsons (*British Medical Journal*, May 16, 1936, i, 1009) it is wise to administer iron to any pregnant woman whose diet is restricted from medical or social reasons. For this purpose the following is a satisfactory prescription :—

℞ Ferri et ammon. cit.- - - - - - - 15 grains
Syr. aurant. - - - - - - - 60 minims
Aq. - - - - - - - - ad 1 ounce t.d.s.

Alternatively, one of the sugar-coated tablets of ferrous sulphate (3 grains) prepared by the Glaxo Laboratories should be given three times a day. An artificially-fed infant can be protected against the development of nutritional anæmia by the daily administration of iron or by the use of a dried milk to which iron has been added, e.g. " hæmolac " (Cow & Gate). In the treatment of established nutritional anæmia inorganic iron must be used, and the following prescriptions, in order of preference, represent the best preparations:—

℞ Ferri sulphat. - - - - - - - - 4 grains
Aq. - - - - - - - - q.s.
Syr. simpl. - - - - - - - ad 120 minims

(The syrup prevents oxidation of the ferrous sulphate.)

℞ Ferri redact. - - - - - - - - 1 grain
Sacch. alb. - - - - - - - - 3 grains
Ft. pulv.

℞ Ferri et ammon. cit.- - - - - - - 4 grains
Syr. aurant. - - - - - - - - 30 minims
Aq. - - - - - - - - - ad 120 minims

One of these should be given three times a day.

THE TREATMENT OF DYSMENORRHŒA WITH INSULIN

While treating a patient suffering from severe malnutrition with insulin for its stimulating effects on metabolism, A. Altschul (*The Journal of the American Medical Association*, April 18, 1936, cvi, 1380) discovered that dysmenorrhœa which had caused the patient to go to bed for the first two days of her menstrual period, entirely ceased. To test whether this was only due to the improvement in the patient's general condition a trial was made in the second instance when fifteen units of insulin were given to a patient actually suffering from severe dysmenorrhœa at that time; relief was obtained after about thirty minutes. The method has therefore been utilized in other patients and, although there has been some variation according to the particular commercial brand of this substance used, there has been some relief in all cases. Insulin is given in injections of five to ten units, followed by orange juice, either for three to seven days before a period or actually during the painful stage of the period itself. There was no severe insulin reaction in any patient and blood sugar levels, taken before insulin, failed to show any abnormal levels so that the results cannot be put down to any profound effect upon metabolism. The psychological factor may have played some part, but the patients were usually told that the injection was experimental and was quite uncertain in its effect.

THE TREATMENT OF ALCOHOLISM

The use of conditioned reflexes and of artificially provoked hypersensitivity is described as a means of treatment of alcoholism by E. Martimor and J. Maillefer (*Le Progrès médical*, April 25, 1936, 685). The method of provoking hypersensitivity is to make each patient (as soon as all mental symptoms have disappeared) drink daily a litre of red wine and every other day 10 c.cm. of blood are taken first thing in the morning from a vein in the arm and injected into the buttocks. With a few patients this method alone was sufficient to produce nausea, vomiting, headaches and insomnia until after the third or fourth injection when distaste for wine was definitely established. With others, however, the results were not so definite and therefore the production of a conditioned reflex to alcohol was employed. A dose of ipecacuanha was mixed with the daily ration of wine with the full knowledge of the patients and the taste was said to be little modified. The result of drinking wine treated in this way was usually to provoke vomiting and diarrhœa and in certain cases the symptoms persisted even when the ipecacuanha was omitted from the daily alcohol ration. The combination of these two methods was claimed to have produced good results and subsequent histories have proved satisfactory since the intolerance produced has persisted.

HIP DISEASE AND SCIATICA

The differential diagnosis between an arthritis of the hip joint and sciatica is sometimes very difficult, but as is pointed out by E. Stotzer (*Schweizerische medizinische Wochenschrift*, March 21, 1936, lxvi, 286) it is important that it should be made from the point of view of treatment. He sums up the important points as follows :—Sciatica usually begins suddenly, often as lumbago, whereas in hip disease the pain is insidious sometimes felt first in the knee and is more often described as a sense of tiredness in the affected leg. In arthritis, the function of the hip is definitely interfered with so that the affected leg cannot be crossed over the sound side and limping is more marked than in sciatica. Passive movements in sciatica, particularly stretching the nerve, produce pain which is not found in hip disease. Pressure on the hip joint produces pain usually in the inguinal region whereas in sciatica the pressure points in the upper part of the leg are rather more or often posterior. A loss of ankle jerk and changes in sensation may be found in sciatica, but not in hip disease. Wasting in hip disease is more marked in the buttocks and thigh of the affected side, but in sciatica the lower leg is affected, if any.

GENTIAN VIOLET IN SKIN DISEASES

The use of gentian violet (which is a mixture of crystal and methyl violet) in an aqueous solution has recently been advocated as of value in skin disorders and F. C. Florance (*The Medical Journal of Australia*, April 4, 1936, i, 466) confirms this. He emphasizes that a 2 per cent. solution of gentian violet in water is the most suitable strength for secondarily infected dermatoses except in paronychia, for which he advocates a 3 per cent. solution. Solutions of this dye and other similar dyes in spirit are considered to be on the whole too irritating. As the gentian violet is used in watery solution it is apt to be very drying and it is recommended that treatment over a large area be suspended every two or three days and an inunction of olive oil and vaseline substituted to stop the tendency of the skin to crack or fissure. Florance has found a 2 per cent. watery solution of gentian violet of use in impetigo, impetiginized eczema, intertrigo, eczematoid ringworm of the feet and hands, paronychia (a slightly stronger solution may be used) and seborrhœic dermatitis. In the deep-seated pustular conditions such as furunculosis or sycosis the dye is not of much avail as its action is too superficial.

TUBERCULOUS APPENDICITIS

The possibility of tuberculous inflammation of the appendix is mentioned by M. L. Bonnet (*Bulletins et mémoires de la Société des Chirurgiens de Paris*, February 7, 1936, xxviii, 49) who describes a typical case with observations on the condition in general. It is claimed that with careful bacteriological examination of the appendix removed at operation tuberculous disease is present in about two per cent. The condition may arise in association with pulmonary lesions or in those patients in whom there is no obvious disease in the lungs. Several types are described. The acute form closely simulates ordinary acute appendicitis, but it is stressed that diarrhœa is a common symptom. The chronic variety differs from ordinary chronic appendicitis in that besides tenderness at McBurney's point there is a less localized feeling of discomfort in the whole ileo-cœcal region, together with diarrhœa. The most frequent type of tuberculous appendicitis appears to be subacute and there is also a latent form in which the disease is only recognized following a sudden exacerbation of the ordinary acute type. Operative interference is the treatment of choice and even when there are pulmonary lesions present this line must be pursued with a careful choice of anæsthetic. According to some observations, lung lesions have been known to heal rapidly following the removal of a tuberculous appendix.

MASSAGE OF THE BRAIN

The idea that it is possible to exercise an indirect pressure on the brain by a rhythmical and alternate compression of the jugular veins is utilized by L. Hallay (*Medical Record*, May 6, 1936, cxliii, 382) in the treatment of schizophrenia. He calls the method of treatment "massage of the brain" and records that in some instances "lucid intervals" have been obtained in otherwise mute, catatonic patients by rhythmical compression of the jugular veins. It is suggested that similar indirect brain massage can be obtained by gymnastic exercises, particularly of the respiratory system, by hard exercise, by excitement and by manipulation of the limbs, after scopolamine has been used to reduce muscle tone. It is claimed that the prognosis is favourably influenced in patients with schizophrenia with treatment on these lines.

REVIEWS OF BOOKS

Post-Graduate Surgery. Edited by RODNEY MAINGOT, F.R.C.S. London : Medical Publications, Ltd., 1936. Vol. 2. Pp. ix and 1747 to 3572. Coloured plate 1; Figs. 847 to 1980. Price, for the 3 volumes, £9 9*s*., or 70*s*. per volume.

THE second of the three large volumes of this comprehensive work follows closely upon the first volume reviewed in these columns earlier in the year. The pages and figures run continuously throughout the volumes, and attention should be specially directed not only to the copious supply of illustrations but also to their quality and apposite character. The volume begins with an account of the surgery of the head, including intracranial tumours and trigeminal neuralgia, of the spine and the salivary glands; this extensive commission is in the capable hands of Mr. C. P. G. Wakeley, who points out that the high speed attained by cars and motor bicycles is now producing injuries previously seen only in military practice, and deprecates any tendency to label cases as " concussion," " cerebral irritation " or " fractured base," and to treat them as " per label." The next article, that on the neck, is contributed by Sir William Wheeler, who deals with the various forms of thyroidectomy and on parathyroidectomy, laryngotomy and other operations. The account of the surgery of the thorax is prefaced by Dr. R. S. Johnson's useful description of post-operative chest complications, their prevention and treatment. The same author writes in detail on artificial pneumothorax, and Mr. Holmes Sellors is responsible for the surgical treatment of pulmonary tuberculosis, acute and chronic empyema, pulmonary embolism and tumours. The important subject of gynæcological surgery is undertaken by Mr. Lyle Cameron, the problems of sterility are discussed by Mr. S. Forsdike, and Dr. Green-Armytage, in his summary of ovarian tumours, speaks of hypernephromas as not uncommon, but does not mention the alternative and more probable origin in the lutein cells. A full account of the male urino-genital organs is provided by Mr. J. C. Ainsworth-Davis; Mr. Lawrence Abel's admirable and monographic article on the sympathetic nervous system is followed by Mr. Broster's essay on the surgery of the adrenals, fortified by the account of the surgical pathology by his colleague, Dr. H. W. C. Vines. Other subjects dealt with in this volume are injection therapy, infections of the hand, and orthopædics.

Vascular Disorders of the Limbs. By SIR THOMAS LEWIS, C.B.E., F.R.S., M.D., D.Sc., LL.D., F.R.C.P. London : Macmillan and Co., Ltd., 1936. Pp. xi and 111. Price 6*s*. 6*d*.

Synopsis of Diseases of the Heart and Arteries. By GEORGE R. HERRMANN, M.D., PH.D. London : Henry Kimpton, 1936. Pp. 344. Illustrations 88, and 3 coloured plates. Price 17*s*. 6*d*.

SIR THOMAS LEWIS'S book can be regarded as a supplement to his *Diseases of the Heart*, published three years ago, and, like that volume, it is an interpretation of modern research into cardiovascular problems for the benefit of students and practitioners. After an introductory chapter on the circulation in the limb and its testing, which is a masterpiece of condensation, the book proceeds to deal with the effects of obstruction of this circulation in its various aspects—embolism, thrombosis, intermittent claudication, arterial disease and the various spasmodic types of arterial disorder which have been so particularly studied by Sir Thomas and his pupils. Sections on gangrene, vasodilatation and on vascular disorders in diseases of the nervous system complete what must be welcomed as a most valuable monograph.

Professor Herrmann has prepared a synopsis for the use of students and general practitioners. It is more readable than many such summaries and appears to present the essential facts in an easily-assimilated manner. The title is not quite a fair one since only fourteen pages are devoted to disease of the arteries out of a total of 344.

Poisons Law. By HUGH N. LINSTEAD. London: The Pharmaceutical Press, 1936. Pp. 444. Price 5*s.*

THE brunt of the new regulations concerning the sale and prescription of poisons must fall upon the pharmacist, but to an only slightly less degree, practitioners in medicine, dentistry or veterinary science are implicated. Mr. Linstead, who is secretary of the Pharmaceutical Society of Great Britain, has written this book primarily for the use of those carrying on business as chemists and druggists, but its scope is extensive enough to prove useful to medical practitioners and others concerned with "poisons." The inverted commas are deliberate because not only is it difficult to accept certain of the substances in the various lists as coming within the usually accepted definition of poisonous, and also because Mr. Linstead has provided something much more than a guide to the new regulations. An excellent historical background is sketched together with a chapter on the international aspects of the Dangerous Drugs Act. It is regrettable that certain promised amendments to this Act were not available in time to be included in this book, and it is announced that a slip will be issued to cover necessary corrections. An excellently planned appendix gives a list of poisons and substances containing poisons together with a whole series of symbols indicating clearly how special restrictions apply in each case.

Pathology of the Nervous System. By J. HENRY BIGGART, M.D. Edinburgh: E. and S. Livingstone, 1936. Pp. xvi and 335. Illustrations 204. Price 15*s.*

THIS beautifully illustrated production has grown out of Dr. Biggart's lectures to undergraduates and to those preparing for the diploma in psychiatry, and throughout the author stresses the application of the general principles of pathology to the special problems of the nervous system. Dealing with the accepted views it is clear, with matters of doubt it is helpful, and excellent histological illustrations are presented to support the author's views on difficult subjects, especially concerning tumours of the nervous system when terminology is such a bugbear to students. Certainly if students are to be interested in neurological pathology this is the sort of book which should attract them, and the author, together with those collaborators responsible for the illustrations, must be congratulated on a valuable addition to medical literature.

A Manual of Practical Obstetrics. By O'DONEL BROWNE, M.B., B.Ch., B.A.O., F.R.C.P.I., L.M., M.C.O.G. Bristol: John Wright & Sons, 1936. Pp. 350. Figures 236, and 12 plates. Price 20*s.*

THIS book has been written for the student as well as the general practitioner and it should prove useful to both. It is difficult to encompass so large a subject in 350 pages, but the author has not left out anything of importance, and has been able to include the theoretical side to a considerable extent. The illustrations are good and nearly all original. They are more descriptive than those found in the average textbook and when examined in conjunction with the text make the various obstetrical manœuvres quite easy to understand. The arrangement of the text is a little unusual because the author wishes the more involved subjects to be dealt with after the essential features of obstetrics have been acquired; this is a sound plan. A chapter on radiology in obstetrics is well written and illustrated, but there is considerable detail which is probably not necessary for the average reader, although the subject of X-ray pelvimetry and cephalometry has received much attention of late. Trial labour and premature induction of labour are discussed in some detail and pubiotomy is recommended in certain cases. The teaching of the Dublin School is evident in most chapters of this volume, which is to be recommended both as a textbook for students and as a book of reference.

Vitality and Energy in Relation to the Constitution. By T. E. HAMMOND, F.R.C.S. London: H. K. Lewis and Co., 1936. Pp. xii and 314. Figs. 5. Price 12*s.* 6*d.*

THIS pleasantly written sequel to the author's book on "The Constitution and its Reactions in Health" is dedicated to the late Sir A. E. Garrod for whom he clerked in 1910 and who had much to say about constitution, diathesis and idiosyncrasy in his Huxley lecture at Charing Cross Hospital in 1927. The field covered in the present volume is wide, for it deals with the nature and treatment of bacterial disease, the variations in energy and resistance to infection during the seasons of the year and the hours of the day, and other practical questions. Thus the author's prostatectomies do so much better in the summer that risks, which would prove fatal in the winter, can then be taken. The late Sir Thomas Smith, of St. Bartholomew's Hospital, is quoted as always preferring to do his cleft palates after the month of May. There are two appendices: that on the function of the testes after puberty contains some wise advice on the subject of operations performed to bring about rejuvenation; the second on euthanasia is reprinted from *The Practitioner* (1934, cxxxii, 485). Old students of St. Bartholomew's will be interested in his reminiscent remarks, under the familiar heading of "Round the Fountain," about the then staff; the physicians were in no hurry to call in the surgeons and thus students were able to watch the natural course of the disease, and, though some patients died for want of operation, many recovered.

NEW EDITIONS

A Textbook of Psychiatry for Students and Practitioners, by D. K. HENDERSON, M.D., F.R.C.P.E., and R. D. GILLESPIE, M.D., F.R.C.P. (Oxford University Press, 18*s*.) The fourth edition of this successful and authoritative work, which first came out in 1927, has again been revised so as to bring it up to date, for example, by reference in the account of mongolism to the work of Penrose. At the same time it has been kept within the limits of what a textbook should be for general practitioners. As compared with the first edition there are now about eighty more pages.

Cystoscopy and Urography, by J. B. MACALPINE, F.R.C.S. (John Wright & Sons, 30*s*.), is more than a new edition, for the recent rapid developments in radiographic investigation of the genito-urinary tract has led the author to add a completely new section on urography and this subject is now included in the title. This second edition is therefore almost a new book with 141 new illustrations and six fresh chapters, three of which deal with urography. The whole production is excellent and this must be regarded as the standard work on the subject.

Orthopædic Surgery, by WALTER MERCER, M.B., CH.B., F.R.C.S E. (Edward Arnold & Co., 40*s*.), appears in a second edition only four years after the first and in the present volume the author has included all the recent advances published up to the beginning of 1936. Certain sections have been rewritten and there are two new chapters on circulatory disturbances of the extremities and on manipulative surgery. The result is the addition of 200 more pages and 37 new illustrations.

A Descriptive Atlas of Radiographs, by A. P. BERTWISTLE, M.B., CH.B., F.R.C.S.E. (Henry Kimpton, 42*s*.), a skilfully edited collection of X-ray illustrations contributed by numerous experts, is now issued as a revised and enlarged third edition. As a feat of publishing and production this volume, with 808 illustrations, must be recognized as a remarkable achievement. Practitioners who have to be their own radiological experts should find the atlas a useful work of reference.

Diseases of the Eye, by Sir JOHN PARSONS, C.B.E., F.R.C.S., F.R.S. (J. & A. Churchill, Ltd., 18*s*.), is the eighth edition of this well-known manual and it contains mention of some of the recent advances in ophthalmological treatment, such as that for detached retina. Recent physiological and biochemical researches are also mentioned.

The Diabetic ABC, by R. D. LAWRENCE, M.A., M.D., F.R.C.P. (H. K. Lewis & Co., Ltd., 3*s*. 6*d*.), is the fourth edition of this popular guide for patients and nurses. Changes in the food values have been made throughout in accordance with recent new analyses.

NOTES AND PREPARATIONS

ROYAL MEDICAL BENEVOLENT FUND

This is the centenary year of this Fund and a special effort is being made to secure more annual subscribers to ensure an immediate increase in income up to £20,000 per annum. Special donations are also required to create a special fund from which grants can be voted for very urgent and distressing cases and towards the education or training of sons and daughters of medical practitioners. These very deserving objects need no special comment and any financial help should be sent at once to the Honorary Treasurer, Royal Medical Benevolent Fund, 11, Chandos Street, Cavendish Square, London, W.1.

THE I.C.A.A.

The Invalid Children's Aid Association recently held a Celebration Banquet to commemorate the fact that through its organization three hundred thousand children had been helped to health and happiness. Further extensions of the valuable work of this society are under consideration and a financial start was made towards their realization by the collection at the banquet of about £2,000. But more than this is required to support a work the value of which many practitioners have learned in their own experience. Any subscriptions or donations will be welcomed at 117, Piccadilly, London, W.1.

NEW PREPARATIONS

Benzedrine Sulphate in tablets of 10 mgm. has been used with success in the symptomatic treatment of narcolepsy and other conditions in which a profound stimulation of the nervous system with a raising of blood pressure is indicated. It is available from Menley & James, 64, Hatton Garden, London, E.C.1.

Curcunat is a new vegetable dye prepared for intravenous injecting as an antiseptic, especially in gall-bladder disease and intestinal sepsis. It can be injected with glucose intravenously or given by the mouth in coated pills. Coates and Cooper, Ltd., 94, Clerkenwell Road, London, E.C.1, issue curcunat in tins of thirty pills.

Eulykol, a mixture of the phenylethyl esters of a selected fraction of the acids of hydnocarpus oil, is sometimes designated "phenylethyl hydnocarpate." In the treatment of lupus vulgaris it has been shown clinically that hydnocarpus esters are effective in quickly clearing up the patches. This produce, prepared by Burroughs Wellcome & Co., Snow Hill, London, E.C.1, under a British patent, is now available in bottles of 25 c.cm.

Fangat is a medicated cataplasma prepared from the soil of a volcanic mountain range in Germany. It is supplied in aluminium containers by Coates & Cooper, Ltd., 94, Clerkenwell Road, London, E.C.1.

Fortamin is a new tonic of vegetable origin useful for all conditions where "bitters" are indicated. It is pleasantly prepared and imported by Schering, Ltd., 188, High Holborn, London, W.C.1.

and the drops of urine retained behind it are a cause of chronic urethritis. Narrower strictures can, of course, become dangerous to life by interfering seriously with complete emptying of the bladder, by the back pressure which they set up and by septic infection of the urethra and bladder. Most urethral strictures can be treated satisfactorily by systematic dilatation, either with solid instruments or with mechanical dilators.

The technique of passing instruments through the urethra must be well known and only a few points in it need be mentioned here. First it is necessary to insist on the importance of irrigating the urethra with an antiseptic lotion before and after passing an instrument. A urethra which is the seat of a stricture is commonly infected with septic organisms and the passage of an instrument, however carefully performed, usually produces some breach of the surface so there is little wonder that catheter fever can result from the operation unless the organisms have been removed and weakened in virulence by preliminary lavage of the urethra. This might be thought to be self-evident, but it is surprising that so many surgeons, who would be horrified at the idea of anyone producing a breach of the skin surface without first cleansing it, are in the habit of passing instruments through surgically unclean urethras without any preparation by irrigation. In most cases no harm results, but every now and again the patient develops septicæmia, which is wrongly regarded as an unavoidable misfortune. In the case of strictures smaller than No. 6 Charrière (No. 2 English) there may be very great difficulty in finding the opening. It is a help in such a case first to fill the urethra with a local anæsthetic containing 1 in 5,000 adrenaline chloride or similar vasoconstrictor and, after the anæsthetic has had time to act, to inject a good lubricant. After this it is often a good plan to pass a straight metal sound as far as it will go. Such an instrument, with its torpedo-shaped end, will not easily make a false passage and seems to make it easier for a smaller, soft instrument to find its way through the narrower parts of the stricture. If the guide of a Philips' (sometimes called Canny Ryall's) bougie can be slipped through the stricture, there is usually no further trouble because followers of progressively increasing size can be screwed on to the guide and the stricture quickly dilated to a size which will easily take metal instruments. Alternatively, these tight strictures can be dilated first with an Amici's tapering whalebone bougie or a Harrison's whip, but this is not usually so manageable as the Philips' with its separate guide. The utmost patience is necessary in dealing with these strictures. Impatience leads only to forceful methods, false passages and endless trouble afterwards for everyone concerned.

Urethral fistula caused by gonorrhœa is usually the result of ulceration and leakage of urine behind a tight stricture, or of a peri-urethral abscess which has been allowed to burst or been freely opened. Such a free opening can provide an easy by-pass for urine, and it seems better to treat a peri-urethral abscess by aspiration, through a hollow needle fitted to a syringe, followed by injection of colloidal silver or 1 or 2 per cent. mercurochrome. In this way a pad of tissue blocks any opening there may be in the urethra.

Acute Cowperitis with abscess formation is not a common complication of gonorrhœa but seems to occur chiefly in cases in which stricture of the urethra between the opening of Cowper's duct in the bulb and the meatus causes a considerable back pressure; in such cases the septic infection which commonly accompanies a tight stricture is a factor.

Chronic Cowperitis is often overlooked, and the patient's complaint of discomfort in the perineum is attributed to prostatitis because in examining per rectum the practitioner fails to try to palpate the

Cowper's gland on each side between his index finger in the anal canal and his thumb just to one side of the perineal raphe. In chronic Cowperitis a tense swelling about the size of a cherry or less may be felt. Probably the best treatment is enucleation of the gland.

Chronic prostatitis and vesiculitis are common sequelæ of gonorrhœa and are the usual foci from which metastatic complications of gonorrhœa are fed. In a certain number of these cases one or both vesicles can be palpated quite easily and more often one or both lobes of the prostate can be felt to be enlarged, but in a high proportion there is no sign other than pus and bacteria in the secretions expelled by massage of the prostate and vesicles, and the gonococcus is not often found in the secretions. The common method of treatment is to massage the prostate and vesicles every four or five days, but diathermy to the prostate and vesicles in addition to massage appears to be more efficacious than massage alone. It is important to remember that by no means all prostatitis and vesiculitis is venereal in origin; various authors have calculated that 20 to 25 per cent. of the cases are due to infection with different organisms (including influenza bacilli) through the blood stream.

Gonorrhœal epididymitis when double usually, though not invariably, results in sterility through failure of spermatozoa to pass through the blocked globus minor. The operation of epididymo-vasotomy introduced by Martin has sometimes provided a successful by-pass. Recurrent pain in a vas deferens, perhaps with swelling of the epididymis on the same side, can occasionally be a cause of great mental distress to a patient who has once suffered from gonorrhœa because he imagines that the signs mean a recurrence of the disease. Examination shows that the swelling of the epididymis is too fleeting to be due to inflammation, and the cause appears to be a temporary obstruction somewhere between the epididymis and the opening of the ductus ejaculatorius into the urethra, possibly in the opening itself, or in the passage of the duct through the prostate. It is usually relieved by prostatic massage or by sexual intercourse.

GONORRHŒA IN WOMEN

Gonorrhœa in women is well known to be one of the commonest causes of salpingitis, with hydrosalpinx and pyosalpinx, but although salpingitis is a very common complication of gonorrhœa, judging by operation statistics and what is known of the prevalence of gonorrhœa, the proportional incidence of hydro- and pyo-salpinx in it must be very low. How often double salpingitis is responsible for sterility is uncertain. Giles put the proportion of sterile marriages in this country at 10 to 16 per cent. and the percentage of these due to tubal disease at 10·9, so that, according to this, a minimum of 1 per cent. of all marriages are sterile through tubal disease, which would usually be gonococcal since the other great cause of tubal disease, puerperal sepsis, has had no opportunity of taking any part.

LYMPHOGRANULOMA

The virus of lymphogranuloma inguinale or "climatic bubo," which has now been shown to be a venereal disease, can cause severe trouble in the ano-genital area. In women the fistulous and elephantoid condition of the external genitals and anal region called esthiomène has been shown by Frei's skin test to be due to this cause. Esthiomène may be associated with rectal stricture due to infection of the lower end of the rectum with the same virus, or rectal stricture may occur (usually in sodomites) without any obvious sign around the anus other than a troublesome discharge. Rectal stricture has now been shown to be due to lymphogranuloma inguinale infection so many times that the Frei skin test should always be applied in such a case.

The antigen consists of pus from a lymphogranuloma inguinale bubo suitably sterilized. A little of it (0·1 c.cm.) is injected into the skin of the front of a forearm, and the result read forty-eight hours later. A positive reaction is indicated by a dome-shaped infiltrated papule, with more or less surrounding erythema, which persists for a week or longer.

No satisfactory treatment has been devised. In proctitis due to this cause good results have been seen to follow protein-shock therapy, by intravenous injections of some vaccine such as dmelcos or T.A.B., in conjunction with intramuscular injections of fouadin every other day in doses increasing from 1·5 c.cm. to 5 c.cm., and suppositories of iodoform.

SYPHILIS

Of the late effects of syphilis on the skeletal structures, probably the most important are those affecting the *mouth* and *nose*. On the mouth side there may be a simple nodular, gummatous ulceration of the mucous membrane of the tongue, faucial pillars and palate of no great depth and, although painful, readily amenable to treatment. A more severe process starts in the submucous tissues of the soft palate and rapidly proceeds to perforation and more or less extensive ulceration of the soft palate spreading to the pillars of the fauces and the posterior pharyngeal wall. Serious deformity of the soft palate and faucial pillars results from cicatricial contraction of the parts affected. In other cases the process starting in the hard palate leads by necrosis of bone to perforation of this structure unless it is quickly recognized and treatment instituted. The first sign of it is usually a rather doughy swelling with a little reddening of the mucous membrane covering the hard palate, and as it is painless the patient may neglect seeking advice about it until the centre ulcerates. Then the danger is that the practitioner may delay the institution of energetic treatment, with the result that a sequestrum of a portion or even the whole of the hard palate may form and cause a perforation of corresponding size.

In the *tongue* the discrete gumma is by no means so common as diffuse interstitial glossitis, which may be deep or comparatively superficial, and generalized or only limited in extent. The signs of this affection must be familiar, and all that need be mentioned here respecting it is its tendency to become carcinomatous. The danger is that an epitheliomatous ulcer on a tongue which is obviously the seat of a diffuse interstitial glossitis with leucoplakia may be thought to be only syphilitic, or at any rate it may be decided to try anti-syphilitic treatment for it and this be continued too long before steps are taken to obtain a histological examination of the lesion. The danger is all the greater because often the first result of the treatment is some improvement in the ulcer, which may strengthen the feeling that it is only syphilitic.

In the *nose* diffuse gummatous infiltration of the different bones may result in necrosis with a very offensive purulent discharge, which dries to greenish-black crusts. Unless treatment is prompt, loss of support to the nasal arch and cicatricial contraction may lead to serious mutilation and deformity. From what has been said above it will be clear that in most tertiary lesions affecting the palatal and nasal structures it is most important to start anti-syphilitic treatment as quickly as possible, and it is wise to have the blood tested as a matter of routine in all cases in which syphilis cannot at once be definitely excluded as the cause of a nasal or palatal lesion. The treatment should moreover be energetic; unless there are contra-indications to arsenical and bismuth treatment it is a great mistake to waste time giving mercury by the mouth, because this may allow the necrotic process to become worse before it begins to take effect. Neoarsphenamine intravenously or sulpharsphenamine intramuscularly in conjunction with one of the bismuth preparations intramuscularly should be given in doses as large as are reasonably safe from the first. The individual dosage to be employed in the continuation treatment after the syphilitic process has been brought under control may perhaps be reduced, but in most cases there is no justification for a timid dosage at the outset when it is all-important to stop the syphilitic activity at once.

Tertiary syphilis of the *lung* is too rare to require more than its mention here. The *stomach* is the seat of gummatous changes sufficiently often to justify syphilis being taken into account when considering the causation of symptoms suggesting carcinoma. The presence of a positive Wassermann reaction in such a case has fairly often now led to institution of anti-syphilitic treatment and disappearance of all symptoms. The *liver* is commonly affected in congenital syphilis with a diffuse intercellular cirrhosis. In acquired syphilis the commonest lesions are discrete gummata, which are usually multiple and of varying sizes from a pin-head upwards; they are often associated with a diffuse syphilitic hepatitis, and it is easy to understand how gummata pressing on hepatic, portal and biliary vessels, necrosis of gummata with consequent shrinkage, and the contraction from fibrosis of diffuse syphilitic infiltrates can produce signs and symptoms which imitate quite a large number of hepatic diseases. The importance of a serum test for syphilis in all cases of obscure hepatic disorder will be obvious. In treatment most workers are agreed that it is best to rely on mercury or bismuth and large doses of iodides; the arsphenamine remedies are hepatotoxic and in most cases are contra-indicated.

Gummatous *orchitis* is so well known as a late effect of syphilis that it is hard to believe the histories of cases in which painless, enlarged syphilitic testicles have been removed on a diagnosis of new growth, which seems to have rested solely on the absence of any history of syphilis, no blood test being carried out. It is interesting that, while invasion of the testis by *S. pallida* has been shown histologically to occur in most cases of syphilis, invasion of the ovary is rare.

Cardiovascular lesions are probably the most frequent and important of all the late effects of syphilis. Thus various pathologists have found such changes in from 55 to 86 per cent. of all cases of syphilis. Warthin, who studied the histology of syphilis intensely for over 25 years, found aortitis in 97·6 per cent. of autopsies on syphilitic subjects from 1909 to 1919 and in 86·3 per cent. of those examined from 1919 to 1929. E. Langer in 23,105 autopsy reports in the Rudolf Virchow Krankenhaus found that the incidence of aortitis in syphilis had increased from 33·3 per cent. in 1906 to 83·67 per cent. in 1925, but Moore, Danglade and Reisinger give good reasons for supposing that this increase was only statistical, being due to improvements in methods of examination. Roughly only about a third of all cases of syphilitic aortitis seem to be diagnosed during life. In the records of 105 cases in which a diagnosis of uncomplicated aortitis rested on post-mortem examination at the Johns Hopkins Hospital, Moore, Danglade and Reisinger found that only four had been diagnosed definitely and seventeen suspected during life, while in 32·3 per cent. the cardiovascular system had been thought to be normal. In Langer's series the records from 1906 to 1915 showed the ratio of cases clinically diagnosed to cases diagnosed only post-mortem to be as 20 to 44 and in the period 1916 to 1925 as 20 to 25.

Clinical signs appear in most cases in the age period 35 to 55, or in the second and third decades of the infection. With regard to the relative incidence of the different forms of cardiovascular syphilis a recently published study by H. N. Cole and colleagues of cases dealt with in five clinics in U.S.A showed in 6,253 patients admitted with late and latent syphilis clinical evidence of uncomplicated aortitis in 4·9 per cent., of aortic regurgitation in 4·1 per cent., of saccular aneurysm in 1·2 per cent. and of myocarditis in

0·8 per cent. (Authors are generally agreed as to the rarity of gumma of the heart wall.) An important point brought out by this American study was the high proportion (45 per cent.) of the cases of cardiovascular syphilis that were found to have also syphilitic involvement of the central nervous system, and in over half of these the type was parenchymatous. There is general agreement that the earlier cardiovascular syphilis is treated the better the outlook. The difference is so great as to demand quite as careful a watch over the cardiovascular system of a syphilitic patient as is usually kept over his nervous system. The signs and symptoms of cardiovascular syphilis cannot be detailed here, but it may not be out of place to quote those considered by Moore, Danglade and Reisinger as important for the detection of aortitis after their study of the records of the Johns Hopkins Hospital. They are (1) Teleroentgenographic and fluoroscopic evidence of aortic dilatation. (2) A tympanitic, bell-like tambour accentuation of the aortic second sound. (3) A history of circulatory embarrassment. (4) Increased retromanubrial dullness. (5) Progressive cardiac failure. (6) Substernal pain. (7) Paroxysmal dyspnœa. The authors consider that any three of these in a patient with a history of syphilis are strong evidence of aortitis. Cole and colleagues add two other signs which occurred in their series sufficiently often to be valuable, namely "systolic murmur in the aortic valve area and visibly or palpably increased pulsation in the episternal notch."

In treatment many workers exclude arsenical remedies altogether, but they are often useful if given carefully. A good plan seems to be to start with bismuth injections and iodides, and the bismuth preparation which I prefer is a 10 per cent. suspension of iodo-bismuthate of quinine in doses of 3 to 4 c.cm. injected twice weekly to a total of 20 injections in a course. After two courses of this kind, with an interval of a month between the courses, administration of an arsphenamine preparation can usually be started, either neoarsphenamine intravenously or sulpharsphenamine intramuscularly, beginning with small doses given twice weekly and increasing according to tolerance. Treatment must be very prolonged.

This subject cannot be left without emphasizing that, if every practitioner charged with the duty of treating an early case of syphilis would visualize *S. pallida* in the aorta and heart wall of that patient and try to imagine his state after 10 or 20 years, he would determine that, if he could help it, that aorta and heart wall should not be left to the tender mercies of any spirochæte remaining alive in them.

Of late effects in the *central nervous system* the most important are general paralysis, tabes and lesions due to syphilitic cerebral arteritis. Gumma is rare; thus in a recent paper Sézary and Auzépy quote 1,500 cases of cerebral tumour operated on by Th. de Martel and Clovis Vincent in which only three were gummata. Vascular lesions are usually preventable and amenable to treatment by the trivalent arsenical preparations, bismuth, mercury and iodide. In a case of paralysis due to a syphilitic endarteritis it would generally be safest to begin treatment with a bismuth preparation on the same lines as in cardiovascular disease because there is some reason to fear that an arsenical remedy might at first provoke an aggravation of the trouble (Herxheimer reaction). At the same time fear of a Herxheimer reaction can be overdone and through timidity of treatment the damage caused by arterial closure be allowed to increase. If improvement does not set in fairly quickly after starting treatment by bismuth and iodine, injections of a neoarsphenamine preparation should be given and the dose quickly increased. In tabes treatment on the same lines as suggested above for vascular syphilis has given good results, and the methods that have been found so brilliantly successful in general paralysis of the insane, namely pyretic and pentavalent arsenic treatment, should be resorted to only if the ordinary methods fail But mention of general paralysis raises the most important point of all, the prevention of late neurosyphilis. The symptoms of general paralysis have often started when the patient has had scores of injections of trivalent arsenicals, bismuth, mercury and so forth and even in the middle of a course of such remedies. Such a disconcerting occurrence emphasizes the importance of the finding, in which there is general agreement, that if the cerebrospinal fluid is found to be pathological after the fourth year of infection, the ordinary methods of treatment will only rarely restore it to normal. Other methods must be tried, and in chemotherapy tryparsamide injections in conjunction with bismuth have proved the most successful. If they fail, the question of giving some form of pyretic treatment must be considered. The brilliant results which have followed these methods in general paralysis of the insane when they are employed early enough suggest that, when examination of the spinal fluid of every syphilitic patient becomes a matter of routine, and especially when it is insisted upon in cases with evidence that the disease is still active more than four years after infection, the timely treatment which the pathological findings will suggest will cause general paralysis of the insane to become a rarity.

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THE DIAGNOSIS AND TREATMENT OF ACUTE OR EARLY SYPHILIS

By E. T. BURKE, D.S.O., M.B.
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THE Ricordian classification of syphilis into primary, secondary and tertiary phases belongs to the pre-treponema, pre-serological and pre-histopathological era which came to an end about a quarter of a century ago. Such a classification is not sufficiently accurate, comprehensive or detailed for present-day needs. To subserve modern demands, syphilis must be classified into much finer "degrees" than those adopted by Ricord. Syphilis is divided into two main "stages." Hitherto these have been labelled "early" and "late." These terms are very unsatisfactory for the reason that they convey only the idea of the duration of the disease. They have, on that account, been replaced by the terms "acute" and "chronic" so as to indicate that the two stages have not really a time-significance but a pathological one. The condition of "late" syphilis may, by injudicious treatment or the defaulting of the patient, be created at an early period of the disease—within a few weeks of the appearance of the chancre.

Acute syphilis is that stage of the disease extending from the appearance of the primary chancre to the disappearance of the general cutaneous eruption. Although the infection is already generalized throughout the body, the main brunt of the attack is being borne by the lipoid-rich superficial structures such as the skin and mucous membranes. There is present an acute perivascular infiltration consisting of lymphocytes and plasma cells. This is the essential histopathological feature of syphilis from the alpha of the chancre to the omega of the lesions in the brain of a general paretic.

Chronic syphilis is that stage of the disease after the disappearance of the general cutaneous eruption. The parasites have been repelled from the superficial structures and have found a habitat in the viscera and central nervous system. The acute reaction has given place to one of a more chronic character. The lymphocytes and plasma cells have, to a great degree, been replaced by fibrous tissue much of which is reparative in nature. When this condition has been reached, even were every parasite to be annihilated, these fibrotic changes mean permanent structural and functional damage. Injudicious or inadequate treatment given during the acute stage drives the parasites from the accessible superficial tissues into the visceral organs. The effect of the first few injections is to slow-up the acute reaction and to cause it to take on a chronic fibrotic character; and the fact must be recognized that at the beginning, treatment, no matter how efficient it may be, inevitably transforms the case into one of chronic syphilis. The remainder of the therapy must be devoted to eradicating this.

Each stage of syphilis is now further subdivided into " degrees " of increasing gravity and intensity. These degrees are based upon serological and histo-pathological criteria. The classification which will come into force at Whitechapel Clinic on January 1, 1937, is set out on page 143.

Acute syphilis, then, embraces the four degrees of the disease represented by the symbols Σi, Σii, Σiii and Σiv. These are easily distinguished one from the other; and for each a complete schedule of treatment can be prescribed which, when carried through according to plan, ensures that the patient will fulfil the criteria of cure, i.e. no clinical or radiological signs, a persistently negative blood serology and a negative cerebrospinal fluid during an observation period of at least two years from the cessation of treatment.

CLASSIFICATION OF SYPHILIS

Acute Stage		Chronic Stage	
Degree	Description	Degree	Description
Σi	Sero-negative primary.	Σv	Endo- or latent syphilis. (Positive blood serology. C.S.F. negative. No clinical signs).
Σii	Sero-positive primary.	Σvi	Tertiary, cardiovascular and visceral syphilis excluding neurosyphilis.
Σiii	General cutaneous eruption (secondary manifestations) from beginning to full development.	Σvii	Neurosyphilis including meningeal syphilis.
Σiv	The above from time of full development to complete disappearance.	Σviii	Prenatal or congenital syphilis subdivided into 4 age-groups : (1) Under 1 year. (2) 1 and under 5 years. (3) 5 and under 15 years. (4) 15 years and over.

DIAGNOSIS

Accuracy in the diagnosis of acute syphilis is comparatively simple; but three things are demanded: (1) clinical competence, (2) dark-ground examination of serum from lesions and (3) serological investigation. The first is outside the scope of this article, but the fact must be emphasized that such competence can be acquired neither by the reading of printed words nor by the study of graven images, but only by actual contact with patients. The dark-ground examination of serum from lesions—or from the lymphatic glands associated with these—is the sole means of establishing the diagnosis of Σi or sero-negative primary syphilis. Every genital sore is potentially a chancre till it is proved otherwise, and it must be repeatedly dark-grounded. The most rapid and certain cure is to be obtained when treatment is begun in this degree of the disease. The diagnosis of sero-negative primary syphilis must never be made on clinical evidence alone. With regard to this it is disquieting to read in the report of the League of Nations inquiry that a high proportion of the case-records submitted showed that in sero-negative primary cases not only was the *T. pallidum* not found but it was not even looked for. The general practitioner must be competent to take a specimen of serum from a chancre in order to obtain a pathological report on it. This technique is simple and may be learned at a V.D. clinic. In genital lesions speedy diagnosis is vital; and when possible the patient should be sent or be taken to a place where a dark-ground examination can be done at once.

A serological examination is essential in every case of potential syphilis—indeed it is a desirable routine in every branch of medicine—but more particularly in every case of pregnancy. Until the routine Wassermann was introduced at the Johns Hopkins Hospital in Baltimore 5,000 cases of syphilis were missed annually. Every case in which the diagnosis of syphilis is made, may have medico-legal implications; and it is essential that the clinical diagnosis be confirmed by finding the *T. pallidum* and/or receiving one, or preferably two, positive Wassermann reports on the blood-serum.

TREATMENT

The adequate treatment of the acute stage of the disease is the one thing that really matters. The practitioner must have in his own mind no dubiety about the diagnosis. There is no such thing as "probably syphilis." The principle of giving "a few injections so as to be on the safe side in case the condition is syphilis," is courting disaster. The few injections rapidly clear up the superficial signs; the practitioner doubts his own diagnosis; the patient is satisfied with the disappearance of his chancre and rash, and in consequence treatment is given up just at the time when the disease has become firmly established in the victim's viscera. The treatment of acute syphilis should be carried out according to a schedule which should not be curtailed on account of rapid clinical and serological response. There are set out below four schedules of treatment for each of the four degrees of acute syphilis.

	SCHEDULE I. *Sero-negative primary syphilis*			SCHEDULE II. *Sero-positive primary syphilis*		
Week.	Stabilarsan (grams)	Bivatol (c.cm.)	T.U. (*vide* p. 148)	Stabilarsan (grams)	Bivatol (c.cm.)	T.U.
1	0·6	—	0·6	0·6	—	0·6
2	0·6	—	0·6	0·6	—	0·6
3	0·6	—	0·6	0·6	—	0·6
4	0·6	—	0·6	0·6	—	0·6
5	0·6	—	0·6	0·6	—	0·6
6	0·6	—	0·6	0·6	—	0·6
7	0·6	—	0·6	0·6	—	0·6
8	0·6	—	0·6	0·6	—	0·6
9	0·6	—	0·6	0·6	—	0·6
10	0·6	—	0·6	0·6	—	0·6
11	0·6	—	0·6	0·6	—	0·6
12	0·6	—	0·6	0·6	—	0·6
13	0·6	—	0·6	0·6	—	0·6
14	—	4·0	0·8	—	4·0	0·8
15	—	4·0	0·8	—	4·0	0·8
16	—	4·0	0·8	—	4·0	0·8
17	—	4·0	0·8	—	4·0	0·8
18	0·6	—	0·6	0·6	—	0·8
19	0·6	—	0·6	0·6	—	0·6
20	0·6	—	0·6	0·6	—	0·6

Schedules I and II continued from page 145

Week.	SCHEDULE I. *Sero-negative primary syphilis* Stabil-arsan (grams)	Bivatol (c.cm.)	T.U.	SCHEDULE II. *Sero-positive primary syphilis* Stabil-arsan (grams)	Bivatol (c.cm.)	T.U.
21	0·6	—	0·6	0·6	—	0·6
22	0·6	—	0·6	0·6	—	0·6
23	—	4·0	0·8	0·6	—	0·6
24	—	4·0	0·8	0·6	—	0·6
25	—	4·0	0·8	0·6	—	0·6
26	—	4·0	0·8	—	4·0	0·8
27	—	—	—	—	4·0	0·8
28	—	—	—	—	4·0	0·8
29	—	—	—	—	4·0	0·8
30	—	—	—	0·6	—	0·6
31	—	—	—	0·6	—	0·6
32	—	—	—	0·6	—	0·6
33	—	—	—	0·6	—	0·9
34	—	—	—	0·6	—	0·6
Total	10·8 gm.	32·0 c.cm.	17·2	15·6 gm.	32·0 c.cm.	22·0

$$E.I. = \frac{17 \cdot 2 \times 100}{26} = 66 \cdot 1$$

$$E\,I. = \frac{22 \cdot 0 \times 100}{34} = 64 \cdot 7$$

Week.	SCHEDULE III. *Early secondary syphilis* Stabil-arsan (grams)	Bivatol (c.cm.)	T.U.	SCHEDULE IV. *Late secondary syphilis* Stabil-arsan (grams)	Bivatol (c.cm.)	T.U.
1	0·6	—	0·6	0·6	—	0·6
2	0·6	—	0·6	0·6	—	0·6
3	0·6	—	0·6	0·6	—	0·6
4	0·6	—	0·6	0·6	—	0·6
5	0·6	—	0·6	0·6	—	0·6
6	0·6	—	0·6	0·6	—	0·6
7	0·6	—	0·6	0·6	—	0·6
8	0·6	—	0·6	0·6	—	0·6
9	0·6	—	0·6	0·6	—	0·6
10	0·6	—	0·6	0·6	—	0·6
11	0·6	—	0·6	0·6	—	0·6
12	0·6	—	0·6	0·6	—	0·6
13	0·6	—	0·6	0·6	—	0·6
14	—	4·0	0·8	—	4·0	0·8
15	—	4·0	0·8	—	4·0	0·8
16	—	4·0	0·8	—	4·0	0·8
17	—	4·0	0·8	—	4·0	0·8
18	0·6	—	0·6	0·6	—	0·6
19	0·6	—	0·6	0·6	—	0·6

Schedules III and IV continued from page 146

Week.	SCHEDULE III. *Early secondary syphilis*			SCHEDULE IV. *Late secondary syphilis*		
	Stabilarsan (grams)	Bivatol (c.cm.)	T.U.	Stabilarsan (grams)	Bivatol (c.cm.)	T.U.
20	0·6	—	0·6	0·6	—	0·6
21	0·6	—	0·6	0·6	—	0·6
22	0·6	—	0·6	0·6	—	0·6
23	0·6	—	0·6	0·6	—	0·6
24	0·6	—	0·6	0·6	—	0·6
25	0·6	—	0·6	0·6	—	0·6
26	—	4·0	0·8	0·6	—	0·6
27	—	4·0	0·8	0·6	—	0·6
28	-	4·0	0·8	—	4·0	0·8
29	—	4·0	0·8	—	4·0	0·8
30	0·6	—	0·6	—	4·0	0·8
31	0·6	—	0·6	—	4·0	0·8
32	0·6	—	0·6	—	4·0	0·8
33	0·6	—	0·6	0·6	—	0·6
34	0·6	—	0·6	0·6	—	0·6
35	0·6	—	0·6	0·6	—	0·6
36	—	4·0	0·8	0·6	—	0·6
37	—	4·0	0·8	0·6	—	0·6
38	—	4·0	0·8	0·6	—	0·6
39	—	4·0	0·8	0·6	—	0·6
40	—	4·0	0·8	0·6	—	0·6
41	—	—	—	0·6	—	0·6
42	—	—	—	0·6	—	0·6
43	—	—	—	—	4·0	0·8
44	-	—	—	—	4·0	0·8
45	—		-	—	4·0	0·8
46	—	—	—	—	4·0	0·8
47	—	- -	—	—	4·0	0·8
48	—	—	—	-	4·0	0·8
Total	15·6 gm	52·0 c.cm.	26·0	19·8 gm.	60·0 c.cm.	31·8

$$\text{E.I.} = \frac{26\cdot0 \times 100}{40} = 65\cdot0 \qquad \text{E.I.} = \frac{31\cdot8 \times 100}{48} = 66\cdot2$$

In these schedules the arsenical preparation is that known as *stabilarsan*, and the bismuthic agent is *bivatol.*

Stabilarsan is arsphenamine diglucoside and it is issued in ampoules in the form of a solution and is given intravenously. It is particularly convenient for use in general practice as, when the ampoule is opened, the contents can at once be drawn into the syringe, thus eliminating any risk of contamination or of oxidization in the process of making a solution as in any of the "914" powder preparations. In the schedules it is assumed that the injections are given once weekly in the dosage of 0·6 gram. Where the twice weekly method of injection is adopted, each dose should be 0·45 gram, making 0·9 gram in all. Under the thrice weekly plan, the injections are 0·45, 0·30 and 0·25 gram given, say, on Mondays, Wednesdays and Fridays.

Bivatol is a lipo-soluble bismuth compound issued in the form of a clear solution. It is best given twice weekly in 2 c.cm. doses. Each c.cm. of bivatol is equivalent to 0·035 gram of elemental bismuth. It, like all other bismuthic agents used in the treatment of syphilis, must be given intramuscularly or into the subcutaneous tissue.

Treatment is continuous. No rest-intervals are allowed, and the remedial agents are not given concurrently but in alternating series. The schedule for each of the four degrees of acute syphilis is designed so that at the end of it no further therapy will be required. In other words, it gives a cure-rate of 100 per cent.—meaning thereby that when it is carried through according to plan the patient will fulfil the criteria of cure laid down.

The letters "T.U." in the third column of each schedule and the formula at the bottom require some explanation. The figures in the T.U. columns represent the therapeutic unit value of each injection. They are based upon the chemotherapeutic indices of the agents and upon clinical and serological observation. For the arsphenamines, each decimal part of a gram is given a corresponding T.U. value: e.g. 0·6 gm. = 0·6 T.U. For bivatol, the weekly dose of 4 c.cm. (0·14 gm. of Bi) is given the T.U. value of 0·8; 3 c.cm. = 0·6; 2 c.cm. = 0·4; 1 c.cm. = 0·2.

At the end of the scheduled duration of treatment, the T.U. column is added up and the "efficiency index"

(E.I.) is worked out by means of the equation :

$$\text{E.I.} = \frac{\text{T.U.} \times 100,}{\text{W}}$$

Where T.U. represents the number of therapeutic units given and W the number of weeks of the schedule or the actual number of weeks occupied—*whichever is the greater.* A very careful analysis of a gross total of over 2,000 cases treated by various methods and observed for periods of from two to ten years thereafter, has shown that every male patient suffering from acute syphilis who obtains an efficiency index of 60 or over, will pass the accepted tests for cure.

By this method there is thus available an easily applied measuring-rod whereby the medical attendant can tell at any time whether or not the patient has had sufficient therapy. The criterion of adequacy is an efficiency index of 60 or over.

When the patient is not intolerant of arsphenamine or bismuth, there is no place for mercury in acute syphilis. When there is intolerance to one of these drugs, mercury, in the form of colloidal mercury sulphide, may be substituted for it. This is given intravenously twice weekly in doses of 3 c.cm.; the T.U. value of each dose being 0·03. This clearly indicates that in order to get the patient up to an E.I. of 60 or over, the other remedial agent to which he is tolerant must be used for a longer time and in higher dosage than is indicated in the schedules. An important point is that if a patient suffering from acute syphilis has a treatment-gap of three or more consecutive weeks during the first thirteen, he should, on his return, be regarded as a case of *chronic* syphilis and be treated accordingly.

It will greatly facilitate treatment if the record is kept upon the "space-for-time" principle evolved by Sir Jonathan Hutchinson. In this, each horizontal line represents one day. Every seventh line is more heavily marked so that the space between any two thick horizontal lines represents one week. The vertical ruling is into columns representing from left to right: week, date, arsphenamine, bismuth, mercury, pentavalent arsenicals, iodine and therapeutic units. The following scheme shows the method.

Week.	Date.	As. 3.	Bi (c.cm.)	Hg.	As. 5.	I.	T.U.	Remarks.
1	1.1.34	0·45					0·45	Stabilarsan.
	3.1.34	0·30					0·30	
	5.1.34	0·25					0·25	
2	8.1.34	0·45					0·45	
	11.1.34	0·45					0·45	
3								
	16.1.34		2·0				0·40	Bivatol.
	18.1 34		2·0				0·40	
	23.1.34		4·0				0·80	

FURTHER OBSERVATION

When the patient has completed the scheduled number of weeks laid down for the degree of the disease from which he is suffering, the T.U. column is added up and the efficiency index worked out. If this comes to 60 or over, the serological reactions are taken and the patient begins his observation period of two years. If the index is under 60, a simple calculation will show whether or not it is possible to raise it to that figure by giving arsphenamine and bismuth concurrently for four weeks. If the index can be raised, this is done, and the observation period is entered upon. If the figure cannot be so raised, then the patient must be regarded as suffering from chronic syphilis and a new schedule of treatment be begun. The first criterion for cure is, thus, the attaining of a satisfactory efficiency index. During the two years' observation period, Wassermann and Kahn tests are done every thirteenth week after the cessation of therapy. Upon each such visit the patient receives a clinical overhaul, particular attention being paid to the cardiovascular and central nervous systems. At least once during the two years, a lumbar puncture should be done so that the cerebrospinal fluid may be investigated for any abnormalities. A radiological examination of the aorta and heart should also be done.

If the patient successfully passes these tests he may be discharged as cured. If more prolonged observation is desired, it will be found useful to prevail upon the patient to attend for investigation once yearly—during the week in which his birthday occurs. An annual blood test is apt to be forgotten unless it is associated with some important event such as a birthday.

There is one final point of great importance with respect to female patients suffering from acute syphilis. In women, between puberty and the menopause, syphilis may be completely latent—clinically and serologically—and may only become manifest by the birth of an infected child. For this reason, no matter how high the efficiency index or what may be the clinical and serological condition of such a woman, she must receive continuous treatment throughout every pregnancy if a healthy child is to be ensured. A man who has an index of 60 or over will always pass the cure tests and will not infect his wife or their progeny; but in a woman during the reproductive period of life it is quite a different story.

THE DIAGNOSIS AND TREATMENT OF THE LOCAL COMPLICATIONS OF GONORRHŒA IN THE MALE

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IT is well known that the severity and duration of an attack of gonorrhœa in the male depend chiefly upon the occurrence of various complications that may ensue during the course of the disease. The advice given and the treatment instituted at the beginning of an attack should include measures which are likely to decrease the risk of these complications. The patient should be warned to avoid late hours, sexual excitement, alcoholic drinks, dancing and all athletic pursuits, particularly riding a horse or bicycle. The scrotum should be supported by a suspensory bandage.

The incidence of complications in gonorrhœa is stated to be diminished after the oral administration of urinary antiseptics such as hexamine, acriflavine, caprokol and the more recently introduced pyridine derivatives. The most useful of these preparations has been acriflavine in doses of a half grain twice daily. It is advisable for the patient to avoid becoming constipated, but it is equally necessary to avoid drastic purgation for this may precipitate an acute swelling of the prostate gland. Mechanical injury to the urethral epithelium during treatment plays an important part in the production of complications and the introduction of any instrument into the urethra during the acute stage of the disease is indefensible. For the same reason the use of high pressure during irrigation or concentrated antiseptic solutions is condemned. Rest in bed in the initial stage of the disease whenever possible is advisable. The use of gonococcal vaccines in the first few weeks is reputed to have some value in lessening the incidence of these complications.

A not infrequent local complication of gonorrhœal urethritis is a *suburethral abscess.* This is usually of small size and remains localized on the under surface of the penis. Suppuration ensues rather slowly and after several days treatment with moist heat the swelling may resolve or drain into the urethra. When fluctuation is evident, aspiration of the fluid contents may be successful in assisting resolution, but occasionally free drainage by incision is called for.

When the disease spreads to the posterior urethra the prostatic ducts become exposed to infection. If the inflammation spreads deeply into the ducts the prostatic follicles become involved. It is advisable when signs of acute posterior urethritis become evident that all local urethral treatment should be omitted until rest in bed and sedatives, such as alkalis and hyoscyamus or sandal wood oil, have controlled the acute stage.

PROSTATITIS

When the inflammation spreads to the glands of the prostate there results a follicular prostatitis, in which condition the prostate gland is not greatly enlarged but is tender and may be nodular on rectal examination. The urinary symptoms, if the posterior urethritis be not acute, may not be prominent, but defæcation is painful and there may be constant mild pain in the rectum. Usually with suitable treatment the condition does not progress beyond this stage.

A wider extension of the inflammation in the prostate gives rise to the parenchymatous prostatitis in which the fibro-muscular stroma is also affected. The symptoms, both local and general, are similar to those of the follicular variety but are much more accentuated. The temperature is raised with considerable local and general disturbance. There is a feeling of weight in the rectum with pain radiating to the perineum, genitals and thighs. Micturition is frequent and painful, chiefly due to the involvement of the posterior urethra and the adjacent trigone of the bladder. There is also obstruction to the outflow of urine by the swollen prostate and spasm of the sphincters. Defæcation may be especially painful with distressing spasm of the levator ani and the anal sphincters. The levator ani which closely embraces the sides of the prostate gland would press particularly strongly on that organ when it is enlarged. On palpation per rectum, which must be done with great gentleness owing to the tenderness, the bowel feels hot and the prostate often projects so markedly that the finger can scarcely be passed beyond or around it.

The *treatment* consists in keeping the patient in bed, of giving demulcent and alkaline fluids, with sandal wood oil if well tolerated or an alkaline medicine with hyoscyamus and, if necessary a morphine and atropine suppository every night and morning for a time. Heat should be applied to the perineum by hot sitz baths or a rubber hot water-bottle and hot rectal douches with normal saline at 115° F. every four hours. The bowels should be moved gently but not too frequently owing to the painful spasm which may follow. It is often advised that copious fluids should be taken, but an unduly large fluid intake may precipitate the onset of acute retention of urine—a not infrequent complication at this stage. The bladder function should be specially watched for retention of urine as the viscus may get slowly overfilled. This gradual failure may pass unrecognized until complete retention ensues. In this event a hypodermic injection of morphine and atropine should be given and the patient made to sit in a hot bath, being encouraged to micturate while in the bath. If this fails a drachm of some local anæsthetic such as 5 per cent. novocaine or 2 per cent. percaine may be injected into the urethra and an attempt made to massage some of it into the posterior urethra. These measures sometimes bring about the desired result but, if they fail, it is better to pass at once a small well-oiled coudé catheter. There is usually no difficulty in this. The urethra should be washed out first with warm boracic acid solution and the bladder afterwards with a solution of potassium permanganate, 1 in 6,000.

PROSTATIC ABSCESS

Both forms of acute prostatitis may result in abscess formation when all the symptoms are aggravated. This is a serious complication and everything must be done to minimize this tendency. The symptoms of a follicular abscess are sometimes subdued and not easy to diagnose. On the other hand in parenchymatous prostatitis the suppuration may extensively invade the stroma and a more or less large fluctuating swelling result. The temperature should be carefully watched and any tendency to shiver or a throbbing pain in the rectum or perineum noted. In general practice the onset of suppuration may be mistaken for influenza, malaria or one of the fevers, owing to the tendency of the patient to conceal the fact that he has a urethral discharge.

Osler related the case of a young man who within ten days of the beginning of gonorrhœa was seized with severe chills and high fever. He died four days later in a condition of profound toxæmia At the autopsy there was acute urethritis and a small prostatic abscess.

A small follicular abscess situated near the urethra may burst into this channel either spontaneously or on the passage of a catheter for the relief of retention of urine. Sometimes this is the first clear indication that an abscess has formed. The evacuation of the contents is followed by immediate relief. A follicular abscess may open into the rectum with a similar result. When an abscess progresses in spite of palliative treatment other measures must be considered. Some surgeons use a short-beaked sound to puncture a localized abscess from the prostatic urethra, guided by a finger in the rectum. Barrenger advocated aspiration from the perineum for a circumscribed abscess before it has broken through the capsule; the needle is guided by a finger in the rectum. He reported fifteen cases with some successful results. In the case of a large abscess the fluctuating swelling felt per rectum is easily recognized, especially when it has broken through the capsule and invaded the tissues between the prostate and the rectum. Such an abscess should be opened from the perineum as soon as it is recognized. In neglected cases the abscess extends widely in the peri-prostatic tissues especially at the base of the bladder and around the sides of the rectum; and may finally discharge into the rectum, urethra or bladder. It has been found invading the ischio-rectal fossa or presenting as a red brawny swelling in the perineum.

It is sometimes difficult to decide in a suspected follicular abscess when surgical treatment becomes advisable. An attempt to open the abscess should not be made until distinct fluctuation is felt, for resolution may take place in what looks like an unpromising case. The general state as well as the local condition must receive due consideration. The more important local indications for operative treatment are the onset of throbbing pain in the swelling or signs of spreading into the surrounding tissues and particularly any sign of peritoneal irritation. The general indications of note are the onset of rigors, the establishment of toxæmia and an increasing leucocytosis.

VESICULITIS

The extension of the infection from the posterior urethra along the ejaculatory ducts may result in acute gonococcal vesiculitis, usually on one side only. This complication, which is by no means as frequent as acute prostatitis, is often associated with it and also frequently co-exists with infection of the epididymis on the same side. At the same time there is usually inflammation of the ampulla of the vas deferens but the clinical separation of the two conditions is difficult and often impossible. Many of the symptoms of acute vesiculitis, particularly the general, urinary and rectal symptoms, bear a close similarity to those of acute prostatitis; and since this complication may also be present, a differential diagnosis from the subjective symptoms is sometimes impossible. There are, however, certain sexual symptoms which suggest involvement of a seminal vesicle. The onset of frequent painful erections and of painful seminal emissions which may contain pus or blood are highly suggestive. The rectal tenesmus and pain are liable to be particularly severe. Colicky pains which simulate renal colic or acute appendicitis are sometimes met with, also pain referred along the vas deferens to the testicle. Frequently, however, there are no very characteristic symptoms and the complication cannot be recognized except by a careful rectal examination. In contrast to posterior urethritis in which the pyuria is constant, the presence of pus in the urine in acute vesiculitis is more or less intermittent; and when hæmatospermia is present the blood is mixed with the semen.

If there is a marked degree of swelling of the prostate gland the condition may be obscured since the swollen vesicle may be beyond the reach of the exploring finger. When there is not much swelling of the prostate the lower part of the infected vesicle can be felt as a hot tender elongated swelling occupying the anatomical position of one of the seminal vesicles immediately above the prostate gland. The walls of the vesicle readily permit extension of the infection into the surrounding tissues so that in most cases there is also present a considerable degree of peri-vesiculitis. When this is marked the swollen vesicle is embedded in an irregular indurated mass situated at the base of the bladder and the outline of the vesicle cannot then be recognized per rectum. Signs of mild localized peritoneal irritation are occasionally noted in this stage, the upper part of the vesicle being in relation with the peritoneum.

The natural tendency in acute vesiculitis, as in acute epididymitis, is to undergo resolution, but this is unlikely to occur for some weeks. If epididymitis has not already developed there is considerable risk of the extension of the infection to this structure. The use of atropine suppositories is indicated and the patient should be warned of the possibility of an inflamed testicle.

The *treatment* of acute vesiculitis during the early stage is similar to that already detailed for acute prostatitis, which is also present in many cases. Resolution of the inflamed vesicle follows on the re-establishment of drainage through the ejaculatory duct or more rarely a considerable portion of the contents of the vesicle may be suddenly expelled as a large blood stained mass of pus and epithelial debris, an event which is followed by marked relief. The evacuation which is accompanied with severe pain may be single or repeated. In more severe cases and particularly when the prostate is also swollen, the obstruction continues and the vesicle becomes distended with pus. The general condition of the patient becomes worse; fever is more marked and rigors are not infrequent. Suppuration may occur in the perivesicular tissues giving rise to an abscess which spreads widely in the pelvic cellular tissues between the base of the bladder and the rectum. Rupture into the urethra or rectum is the most frequent termination or the abscess may break through into the bladder. Rupture into the peritoneal cavity is a rare event, which, if it occurs, is likely to prove fatal from general peritonitis.

When peri-vesicular suppuration is recognized the condition should be relieved by surgical treatment; the abscess is incised from the perineum. Fortunately abscess formation is rare; for in the majority of cases the inflamed vesicle subsides under ordinary treatment, although complete recovery is likely to be protracted.

COWPER'S GLANDS

Acute infection of the bulbo-urethral (Cowper's) glands is not very frequent and is usually unilateral. The small hard painful swelling can readily be recognized by palpation between the first finger in the rectum and the thumb pressed into the perineum. The two glands are situated in the tissues of the perineum below the prostate gland and a little to one or other side of the mid-line. An acute swelling of one of these glands is treated on the same general lines as that of acute prostatitis. An abscess formed in one of these glands is situated at some depth in the perineum and will eventually point on the surface of the perineum a little to one side of the mid-line and may be incised and drained in this area.

EPIDIDYMITIS

Gonococcal epididymis, one of the most frequent acute complications of gonorrhœa, presents no difficulty in diagnosis even in the early stage. Since the part is so readily accessible to palpation and the organ so quickly becomes sensitive to any manipulation, there is frequent opportunity for recognizing this condition before it has made much progress. A slowly descending inflammation of the vas deferens and its surrounding structures can often be noted before the involvement of the epididymis. When the epididymis is involved the swelling is sometimes limited to the lower portion. In the early stage the cessation of all local urethral treatment combined with complete rest, scrotal support, local applications to the scrotum and sedative drugs, will often retard the progress of the inflammation and minimize the usual degree of swelling. In the most frequent and familiar variety of acute epididymitis there is not only a rapid development of the swelling but usually some degree of acute hydrocele as well. To what extent the testis participates in the inflammation is not clearly settled. I have found little or no clinical signs of involvement of the testis itself in the majority of cases. The severity of the inflammation of the epididymis does not depend upon the intensity of the urethral infection. Cases occur in association with a mild urethral infection as well as with a severe one. In a considerable proportion of cases a swelling of the corresponding seminal vesicle can be recognized. In others no evidence of swelling can be found. Occasionally the seminal vesicle on the opposite side is alone affected. In all these cases the infection has spread beyond the anterior urethra and the posterior urethra is necessarily involved: the prostate also is frequently implicated. The presence of infection of the seminal vesicles, of the ampulla of the vas deferens, or of the prostate will render the epididymis very liable to involvement.

As regards the *treatment* of acute epididymitis palliative measures give satisfactory results in most cases. Complete rest in bed, sedatives and a mild laxative are ordered. Considerable attention to detail is required in maintaining high elevation of the scrotum. The ordinary suspensory bandage is useless in the supine position. A small cushion or a cotton-wool pad placed under the elevated scrotum acts well except in a very restless patient. A towel or strapping fixed across the adducted thighs to provide support for the scrotum is another simple method. Large numbers of applications have been advised for the local treatment of the inflamed part, of which lead and opium lotion or belladonna and glycerine are as successful as any. Hot fomentations repeatedly applied also bring considerable relief; when this is impracticable a hot rubber water-bottle may be used. The use of ice packs is sometimes advocated, but I have had no experience of this method. The opinion of that classical observer, Finger of Vienna, was that permanent induration in the epididymis was more frequent after the use of ice than after warm applications. In recent years many attempts have been made to effect the reduction of the swelling and the relief of the pain by the injection of various non-specific remedies. Occasional good results have followed the use of such diverse substances as electrargol, sulfarsenol, contramine and aolan but they do not appear to be consistent. Calcium preparations have attained some recent popularity but the use of calcium gluconate in my hands has yielded little or no improvement. Diathermy when available is an efficient method of relieving the pain and swelling. It is a debatable point whether or not the additional heating up of the tissues of the testis by diathermy may result in injury with subsequent sterility. Experimental work on these lines in animals has shown that atrophy of the spermatogenetic tissues is very readily produced by diathermy although regeneration later usually takes place if the exposure to diathermy has been of brief duration only. The relief afforded by puncture of the acutely inflamed epididymis has long been known. It was advocated by Pirogoff in 1852. Considerable relief can be rapidly obtained by multiple puncture with a surgical cutting needle or a fine tenotome from the resulting reduction in tension. The aspiration of fluid from an associated acute hydrocele is also of benefit for the relief of pain. Puncture with aspiration of the inflamed epididymis is reported to be more effective than puncture alone, although the amount of fluid which can be removed is usually minute. Gas anæsthesia is desirable for these minor operations except sometimes for hydrocele. Exposure of the epididymis by incision through the scrotal wall and with multiple punctures or incisions is advocated by Hagner and other authorities. When pus is suspected at any spot an incision is made into the area and the opening enlarged if necessary.

In the majority of cases of acute gonococcal epididymitis the acute swelling and pain begin to subside in about forty-eight hours. The prolongation of acute symptoms beyond this time should lead to a consideration of one of the surgical measures outlined, not only for the relief of pain and swelling but also to preserve the function of the organ. In this stage simple puncture is frequently satisfactory. In other cases, fortunately less common, the inflammation progresses to suppuration. The swollen epididymis becomes adherent to the scrotal tissues and skin which become œdematous and dusky red. The testis may also become inflamed from direct extension of the infection. Here we are dealing with a suppurative process which if not relieved by surgical means will result in the permanent destruction of the function of the epididymis and perhaps of the testis also. Free incision into the fluctuating area including the testis if necessary is called for.

GONORRHŒA IN WOMEN

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GONORRHŒA is acknowledged to be a common infection in women, and to be the cause of many cases of chronic pelvic trouble, general disability and ill-health. Medical pessimists have declared it to be incurable; and the same belief is not uncommonly held by the layman, with the result that many practitioners seem to ignore the possibility of this infection in their women patients as the easiest way out of a "hopeless" task or, if they admit the possibility, are in some cases content to tell the patient vaguely "to douche." By means of this douching, varying in amount from a pint of lysol solution injected hastily at bed-time with a "whirling spray," to a three-pint douche given to herself by an agitated patient thrice daily (as has been confessed to the author on several occasions) the patient reduces the purulent discharge to a chronic gonorrhœa, and her vaginal lining to a pale and sodden desquamating wall, while the original foci of infection continue to be untouched. The difficulty of getting such a chronic case to pass the present high standard of "tests of cure (*vide* p. 175)" must be admitted at once, but had the case been dealt with seriously from the start, the problem would have been by no means so difficult.

EARLY SYMPTOMS

Gonorrhœa in women is in the overwhelming majority of cases contracted during sexual intercourse, and the severity or mildness of the symptoms depend among other factors, on whether the man is suffering from a virulent type of gonorrhœa, recent or latent, and whether or not the woman is previously a virgin or is pregnant. In any of these cases the symptoms tend to be acute and classical, i.e. there is painful micturition, discharge, and pruritus vulvæ 48–72 hours, or less, after intercourse. Should alcohol, particularly spirits, have been taken in any considerable amount before coitus, the symptoms tend to be very prominent or should intercourse have taken place a day or two before a menstrual period, symptoms again are well marked; dysuria and pruritus occur during the period, and considerable local soreness and profuse discharge are complained of, as soon as the period is at an end. Extension to the endometrium with prolonged menstruation may occur at once, given this combination of circumstances.

In the case of a woman, married or not, who is accustomed to a sex life, the symptoms tend to be less marked, and very frequently all three are not present, but a complaint of dysuria and/or of pruritus, should give rise to a suspicion of a gonococcal infection in such a woman. Bearing in mind the prevalence of birth-control appliances and antiseptics, it is easy to see how there may be little or no vaginal discharge in such a case. Many cases of gonorrhœa now present urethral or rectal infection, because the well-fitted "cap" worn prevents a cervical infection.

Among the local foci of infection, the following may all show signs of involvement: the urethra may be bathed in pus, and the peri-urethral crypts and folds be red and infected: Skene's ducts show red, as if etched in red ink by a needle's point: if pus is not lying in the urethra at the time of examination, gentle but firm massage along the anterior vaginal wall from an inch within, by the examining finger, will produce pus or gleet, which can be taken for examination in smear and culture. The vulva itself must now be examined, and when pruritus is severe the usual signs of rubbing are present. A finger must be passed gently down the inner side of each labium minor to discover whether or not the Bartholin glands are swollen and tender: if so, they should be gently pressed and any escaping bead of discharge taken for examination also. Vaginal examination in an acute case causes pain even when conducted with great gentleness. The condition of the vagina should be noted: if it is hot or has a rough irritated surface, a secondary vaginitis is already present. There may be little or no discharge seen at the vaginal opening, but on making a pelvic examination some thick muco-pus will run out. The position and size of the uterus must next be noted, and the appendages palpated: marked tenderness in one or other vaginal fornix suggests early involvement of the tube, and this will most probably be accompanied by slight but definite enlargement of the uterus. A speculum is then passed and the condition of the cervix noted. Typically, there is an acute erosion the size of a shilling or larger, and the discharge is thick, tenacious muco-pus. When the amount of this discharge is very great, suspicion of intra-uterine infection is aroused. All external discharge on the cervix should be swabbed off with a mounted sponge, and material for films and cultures taken from within the cervix, no force being used during the process. The cervix should then be thoroughly cleansed (as will be explained later), treated, and the swabs and speculum withdrawn.

Next, if there is any complaint whatever of pruritus ani, examination of the lower end of the rectum must be made, by passing a rectal speculum and again taking films and cultures. This symptom in a case of gonorrhœa definitely means that the rectum is infected with gonorrhœa: but apart from this symptom, it must be borne in mind that during the course of a case of gonorrhœa, the rectum may be found to be involved even without symptoms of pruritus and of discharge per rectum. This has been noted by various British and continental observers.[1] The author has now seen a considerable number of cases of acute or chronic proctitis giving gonococcus-positive films and cultures from rectum after the patient has been previously treated and cured of a gonococcal infection or the urethra and cervix; and in one or two instances prior to treatment the rectal symptoms of painful defæcation, pruritus, and discharge per rectum have brought the patient for examination, when it has been found that the urethra and cervix are also infected. Two such cases had been treated over a period of time by practitioners as "colitis" before being diagnosed. This is not so surprising as it may seem, as in gonococcal proctitis of some standing, back-pressure symptoms of colic and alternating constipation and diarrhœa are not infrequently present, in addition to the more local symptoms of pruritus, painful defæcation and passage of rectal pus.

The first examination is concluded by taking blood in two sterile tubes. One is examined by the complement-fixation test for gonorrhœa; the other specimen[2, 3] is used for a Wassermann or Kahn test. If the examination is made only a day or two after the infecting intercourse, the complement-fixation test will not be positive, even in a case of acute gonorrhœa: it is not often positive before the second week after infection at the earliest. Again if the intercourse has been illicit, even if the consort has syphilis as well as gonorrhœa, the Wassermann or Kahn tests would not yet be positive: it is essential to be on the watch for any small pimple or sore, indicating primary syphilis and to have any exudate examined immediately by dark-ground methods. Failing this, a repeat blood test a month later is a wise precaution. Should the clinical appearance and the symptoms definitely suggest gonorrhœa, and yet the first tests be negative, it is absolutely essential to repeat these tests after a provocative. Nature provides an admirable provocative in the menstrual period: tests taken immediately after this is over are positive in the majority of cases of gonorrhœa, but should the next period be not due for two weeks, one of the two following provocatives is useful: either paint the urethra and cervix with an over-strong chemical (e.g. 25 per cent. protargol solution) and repeat films and cultures 36–48 hours afterwards: or have alcohol given (a double gin-and-ginger-beer is useful), tests being repeated the morning after this drink. The latter test, though an admirable provocative for chronic cases or for test of cure towards the end of a treated case, is perhaps double-edged as a provocative in the early stages, as it may, in addition to giving positive tests, cause a regrettable flare-up of the symptoms.

CHRONIC CASES

In more chronic cases of gonorrhœa in women, films and cultures tend to be negative, showing only a marked growth of secondary organisms, staphylococci, streptococci, *Bacillus coli* and diphtheroids, *unless taken immediately following a period or a provocative*: and it cannot be too strongly stressed that in a suspected case of chronic gonorrhœa such tests taken during intermenstrual periods are worthless as a proof of the absence of gonorrhœa in the patient: these must *always* be taken just after a period to be of any real value to patient or doctor. In most chronic cases, however, the blood complement-fixation test is positive.

In chronic cases the symptoms are much less noticeable. Discharge may vary from none at all between the periods to a little just before or just after menstruation: and such a patient may easily console herself and a busy practitioner by saying " but I have always had a discharge." Micturition symptoms are gone, but the patient may be prone to attacks of cystitis. Pruritus is a variable symptom, but I have known it bring a patient for examination fourteen years after being pronounced " cured," as it was one of the symptoms of her early infection.

This patient's case is worthy of comment: she had had a child with severe ophthalmia neonatorum fifteen years before I saw her, had received treatment, been pronounced cured, and had three other children without ophthalmia nor on her part pelvic infection, and yet her cervix was typical of a chronic gonorrhœa, and cervical cultures were repeatedly positive, though films were seemingly innocent.

In acute cases of gonorrhœa in women, films and cultures may equally show infection, though I favour the culture method: in chronic cases only cultures are really valuable, and will time and again prove positive when films are negative and not even "suspicious." Until recently the culture of the gonococcus was found difficult by pathologists: more recently Orpwood Price[4] and other pathologists have experimented with culture media and have found simple media in which the gonococcus grows easily. With a culture of the discharge, at least 35 per cent. of cases of women pronounced "cured" are found not to be cured. Smears do not show gonococci or fresh pus, there are no signs or symptoms, but if there is still infection the culture tube will grow the gonococcus from the urethra, cervix or rectum.

COMPLICATIONS

These may be classified as (1) local and pelvic, and (2) metastatic. Details of the latter cannot be discussed here. The commonest *metastatic* complications are arthritis, tenosynovitis and bursitis: less commonly iritis, and infrequently (save as a part of general gonococcal septicæmia) pericarditis and pleurisy may be present. The skin complication keratodermia blenorrhagica is rarely met with save in isolated cases of untreated gonorrhœa, when the patient works barefoot, and the typical keratodermia, is met with on the soles of the feet: or when very severe manual labour is undertaken and the palms of the hands are affected.

In the case of *arthritis* or tenosynovitis, the joints or tendons of feet, ankles, knees, hands, wrists or elbows are those most commonly affected, depending on whether the patient's feet and legs are exposed to prolonged strain and inclemency of weather, or whether the hands and arms are used for very heavy work. In the case of recurrent iritis, when other possible focal sepsis in the teeth, nasopharynx, gall-bladder, appendix and bowel has been considered, the possibility of chronic gonorrhœa as a cause should not be forgotten. The blood complement-fixation test for gonorrhœa will be positive in the overwhelming proportion of such cases, should the original cause be gonorrhœa. Treatment of these patients resolves itself ultimately into treating the pelvic gonorrhœa, in addition to the appropriate local treatment.

Local and *pelvic* complications of gonorrhœa are acute (or chronic) œdema of vulva, Bartholin abscess, chronic vaginitis, and warts of vulva, perineum and anal areas. Upward extensions include endometritis, salpingitis, pyosalpinx and pelvic peritonitis.

In *acute œdema* of the vulva there has usually been severe pruritus with consequent rubbing by the patient, or there may be acute urethritis, with consequent swelling of the clitoris and upper parts of the labia. In acute œdema of the vulva, particularly if more marked on one side, the possibility of a primary syphilitic sore, in addition, should always be borne in mind.

Bartholin abscess following infective closing of Bartholin's duct, may be one-sided or on both sides. It should be prevented whenever possible, by prolonged hot sitz baths and local hot antiseptic compresses and by the injection of 0·5 to 1 c.cm. of collosal manganese daily for three days. When actual abscess formation has taken place free but careful incision under gas is the best treatment. Incision under local anæsthesia relieves the pain but is rarely efficient, and a chronic sinus may result, which is continuously infectious.

Vaginitis as a complication is more noticeable in the case of a pregnant woman or one previously a virgin : but King and Mascall[5] have shown that chronic infection of the vaginal fornices may persist in married women.

Warts of the vulva, vagina and perineum are found most frequently associated with excess of vaginal secretion as in pregnancy, or when there is a marked pelvic congestion: but they are sometimes found as a complication of chronic gonorrhœa when the amount of discharge is trifling. In pregnant and non-pregnant cases alike, treatment is directed towards keeping the whole area as dry as possible, douches being therefore contra-indicated as a rule: or in the few cases where douching is considered necessary, it must immediately be followed by drying down and powdering of the cervix, vagina and vulva by a nurse. An attempt may be made to remove or control the warts in addition, by burning them off with iodized phenol on fine probes, or by using 1 part of phenol to 4 parts of lactic acid with the same idea. Save when the warts are few and discrete, this is rarely successful: in nearly every case of massive verrucæ, they have to be removed with scissors, under an anæsthetic. In the case of a pregnant woman, unless some marked complication occurred, this should be left till after delivery; and it is interesting to observe how in these cases about 75 per cent. of the warts spontaneously vanish a few days after delivery. If the small operation is left until ten days after delivery when lochia are scantier, the greatest prospect of success is ensured: the warts are clipped off with scissors, a few fine catgut stitches inserted if required and the parts dressed with 1 in 500 flavine in sterile paraffin. Patients state that the pain after this is trivial and in no way disturbs their recovery or interferes with lactation.

Endometritis occurs sometimes in women at the first or second period following infection, or after child-birth or abortion in a woman infected with gonorrhœa. When this is so, there is a prospect of infection to one or both Fallopian tubes. In an acute case there is some suprapubic pain or some pelvic drag or backache, and a profuse amount of muco-purulent discharge. There may be pyrexia and a raised pulse rate, but this is by no means invariable. Cases of severe pelvic peritonitis following pyosalpinx have been seen without any rise of temperature or pulse. In a case of endometritis menstrual periods usually come about every 26–28 days, but are prolonged to seven days and may be excessive. When there is salpingitis the rhythm may be 7/16–19 days associated with frequent micturition and a general ache and drag. On careful pelvic examination an enlarged "boggy" uterus is felt either in front or sometimes retroflexed and held down by pelvic adhesions—a tender mass may be felt on one or both fornices, indicating the involved tube.

Chronic infection of the endometrium and Fallopian tubes is sometimes very puzzling in its signs and symptoms. Rise of temperature is rare: there may be no alteration in the menstrual cycle: but if a very careful history is taken, it will almost invariably be found that at least once—though it may be months before, there was an early and very prolonged period, with heavy loss. Pelvic symptoms may by now be insignificant—a little discharge and backache may be complained of. Symptoms are much more often general—tiredness, ill-health and frequently digestive symptoms are those complained of—in fact it is very easy to label these patients neurotic (as they undoubtedly are). But there is a very definite physical basis for their neurosis, and until it is satisfactorily dealt with the woman is a chronic sufferer who, by her complaints, in time loses the sympathy of husband and friends and is a very unhappy creature.

TREATMENT

Acute cases, whether simple or complicated, should have complete rest in bed. To get this for a case diagnosed "gonorrhœa" would obviously be the precursor of indignation meetings by relatives. To obtain it for "acute cystitis" or "acute cervicitis" is easier by far. This advice about rest is no mere academic recommendation: so much so that a patient with acute gonorrhœa, who develops tonsillitis or influenza, and thereby is confined to bed for a couple of weeks without specific treatment for her gonorrhœa, shows on her next examination an astonishing remission of clinical signs. Next most important in treatment is free drainage. The uterus must be in good position, the bowels freely opened with a morning saline (in addition, if need be, to a usual gentle laxative—senna, paraffin, phenolphthalein). Sexual excitement or intercourse are strictly forbidden and also the taking of alcohol in any shape or form. Strong tea, black coffee, concentrated meat and soups, and all irritants, such as curries and spiced foods, are also banned. Diet should be light and nourishing and a minimum of two pints daily of bland fluids—plain water, barley water, lemonade or imperial drink—advised. In very acute cases with pyrexia, fruit juices, lemon drinks and milk may be the only diet, but usually a generous but " light " diet is best.

When the discharge is very purulent and makes the patient sore and chafed, frequent sitz baths should be used by the patient herself, medicated with one drachm to each pint of bicarbonate of sodium, common salt, dettol or milton. For pruritus, hot saline compresses followed by glycerine phenol applications, or a lotion of sodium bicarbonate and boracic powder, 20 grains of each, and glycerine of carbolic acid, 60 minims, to each ounce of water, gives comfort in the great majority of cases. When there is intense soreness of vulva, zinc cream is comforting. Low-pressure douches of three to four pints of saline, dettol or binodide at 105° to 108° F. given by a nurse may be welcome for a week or two, and when there is extension to the uterus and tubes, six to eight pint douches at 112°–115° F. are routine treatment in many cases. But self-douching by the patient is in the main to be deprecated: it is usually inadequate and gives the patient a false sense of security.

Alkalis by the mouth frequently seem to help the course of the disease, even where there are no bladder symptoms. A half-teaspoonful of sodii bicarb., in water each morning, may be advised for a few weeks, or definitely alkaline mineral waters, such as Vichy or Contréxeville, may be drunk instead. When urethritis is marked or cystitis is present, the routine Mist. pot. cit., 30 grains, with sodii bicarb., 40 grains, may be given with or without the administration of tincture of hyoscyamus or infusion of buchu to relieve pain. In severe cases of cystitis, the pain is relieved better by giving pyridium tablets, one four or five times a day for six or seven days: or Boots' new mandelic acid preparation "neoket" may be useful. If marked mental misery is added to the physical disability, a sedative nightly or every other night is a wise prescription. Proctitis is treated by bowel wash-outs and by instillation of one or two ounces of 10 per cent. protargol daily. Treatment by the doctor consists in cleansing out the urethra and cervix thoroughly with fine dressed probes soaked in saturated solution of bicarbonate of sodium, and thereafter applying pure glycerine or a glycerine compound to the urethra and cervix, e.g. glycerine protargol or 10 per cent. glycerine dettol (in 5 or 6). A few minims of pure sterile glycerine may be gently instilled into the endocervix as recommended by Anwyl Davies,[6] to ensure thorough drainage of the endometrium and endocervix. When the cervix is very inflamed, a small tampon soaked in glycerine may be applied to the cervix for a few hours, or one yard of 3-inch gauze in glycerine may be lightly packed into the vagina for six to twelve hours. It is, of course, essential not to interfere with drainage, or to leave such a dressing in for more than six to twelve hours: boro-glycerine pessaries or merthiolin pessaries on a glycerine base may be used by the patient herself at night. Alternative medicaments preferred by the practitioner may be used. Mercurochrome, acriflavine, chloramine T.

and many others have their adherents, but the principles of rest and free drainage must, in every case, be satisfied.

Vaccine therapy is abused as useless by some workers and considered the only treatment by others. It has proved of definite use in chosen cases, and clinical improvement has been seen after two or three doses. The vaccines of greatest general use have been mixed gonococcus vaccines made from a vigorous strain. The dosage depending on the patient's body weight has begun at 20–25 million, and increase has been by almost 50 per cent. each week, provided the ambulatory patient does not suffer from malaise or reaction. Six to eight doses are usually sufficient. Various vaccines, lysed and otherwise, are being tried out at the present time, but so far no particular clinical improvement has been produced by their use. In America colossal doses of vaccine up to 50 billion have been used, but no proportionate benefit obtained.[7]

In cases of chronic endometritis, the best results are usually got by dilatation under an anæsthetic, curetting endometrium and endocervix lightly, and washing out the endometrium with 40–50 c.cm. sterile glycerine. A No. 8 rubber catheter is stitched into the cervix with catgut (at least one inch of it being in the endometrium) and so long as the catgut stitch holds the endometrium can be washed out daily with 20 c.cm. in sterile glycerine without discomfort to the patient. While the patient is under the anæsthetic for her glycerine drain, any polypi, Nabothian cysts or other pathological conditions are dealt with. Salpingitis and pyosalpinx are dealt with as far as possible expectantly. Formerly long, hot douching and suprapubic heat by means of foments or the electric cradle were the routine treatment, supplemented by glycerine in the vagina, or by belladonna or other sedative pessaries. With the "Elliott machine" from America, pelvic heat up to 130° F.

can be applied to the whole female pelvis with no discomfort to the patient, and it is hoped to cut down still further the proportion of cases for laparotomy. Continuous pelvic pain or menorrhagia after adequate expectant treatment leaves no alternative but operation.

When an old-standing and resistant gonorrhœa has to be dealt with, sometimes after every possible drainage has been done, high-temperature therapy is indicated. In America the " Kettering hypertherm " machine is used to bring the patient's temperature up to 105° F. and keep it there for five or six hours, giving about three treatments. In this country artificial pyrotherapy is usually given by means of intravenous injections of T.A.B., the temperature being rapidly raised to 102°–104° F. with concomitant marked leucocytosis. This treatment can only be given to a patient who is continuously under the eye of a trained nurse between the medical visits. For a few hours the patient feels extremely wretched, with backache and headache, but the improvement clinically and pathologically after three or four of these injections is considered by the patient well worth while.

In cases of gonococcal arthritis the treatment which gives the greatest and most rapid relief to the affected joints is diathermy applied to the urethra or cervix of the patient, as advised by Cumberbatch and Robinson. Diathermy to the cervix is contra-indicated when chronic or subacute infection of a Fallopian tube is present. A flare-up frequently ensues on its use in such a case.

TESTS OF CURE

Before considering the discharge of a patient after treatment for gonorrhœa, the films and cultures should be negative after three succeeding menstrual periods (gonococcus negative and also free from pus). The patient must also be free of signs or symptoms of gonorrhœa, must have been off treatment for three or four weeks wholly before final testing after a provocative. The best provocative is alcohol—gin or other spirits taken the night before the films and cultures taken in the morning. The local congestion resulting from the use of alcohol will astonish many practitioners. If this provocative is not possible, painting the urethra and cervix with 25 per cent. protargol, and taking films and cultures thirty-six hours later, is quite a fair provocative. The blood complement-fixation test should also be made and be negative. Should it be positive, even if films and cultures are negative, it is necessary to consider any possibility of a focus of infection elsewhere.

CONCLUSION

There is a great field of useful work for practitioners in the treatment of patients suffering from gonorrhœa. Specialist treatment is too expensive for many patients. Clinic treatment, even with efficiency and kindness, is disliked by some women. A good proportion can and should be treated by their own practitioners. Tests will be taken if desired by specialists privately, or at the clinics, and the patient referred back again with notes of these reports, to her doctor for further treatment, or observation. But any lack of patience on the part either of practitioner or patient, any contentment with less than these not exacting " test of cure," and another latent gonorrhœa is added to the multitude of untreated or insufficiently treated women. If the patient's " cure " is to be other than a mockery, it must be ensured that the husband or consort is clear of infection before the patient resumes relationships.

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VIRUS DISEASES OF THE EXTERNAL GENITALS AND CHANCROID

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THERE are three common diseases of the external genitals which are now attributed to virus infections: (1) Venereal warts; (2) Lymphogranuloma inguinale; (3) Herpes genitalis.

VENEREAL WARTS

These are seen frequently and affect adult males and females but seldom children. The wart consists of a papillomatous growth which may be represented by a few small areas or by large fungating masses. There has been some confusion regarding the nomenclature, the etiology, and pathology of this condition. There is now little doubt that the papillomatous growth is the consequence of a virus infection and the infection usually occurs through sexual intercourse. The incubation period is long, about three months, and incubation and infection are favoured by conditions of moisture. For example it is rare to find warts growing on the penis of a circumcised man, but they proliferate rapidly beneath a long and tight prepuce. The virus has not been isolated or identified and there is no accepted test for its presence. This condition is not related to gonorrhœa in any way, but warts may occur in a patient with leucorrhœa, syphilis, or gonorrhœa. There is no general bodily reaction, and no serological or hæmatological change has been recognized. The regional lymph glands are usually unchanged. The Wassermann reaction, the Kahn test, and other serological tests for syphilis are negative.

Clinically the condition is easily recognized. A number of soft papillomatous growths appear—having a distinct narrow base or pedicle and with a rough corrugated and greyish keratinized top. Adjacent masses become confluent and they increase in size rapidly while numerous new "warts" appear in the vicinity. The warts bleed readily. The common site in the male is the coronal sulcus and inner surface of the prepuce, and occasionally in severe cases the glans penis in addition. The perineum is rarely involved in male cases.

In the female the warty masses are seen on the labia majora and minora and on the perineum and round the anal orifice; the posterior vaginal wall and the urinary meatus may be involved, and in obese or unclean subjects the thighs may bear a crop of warts.

In about 50 per cent. of cases warts may be found on the hands of the patient, and it is probable that the genitals are infected from the growths on the hands.

During pregnancy the warty masses on the female genitalia may become very large, fungate, and cause a foul discharge. In a few cases the warts complicate delivery. If untreated the warts form a confluent mass with deep fissures, ulcerated areas, and often a discharge with a foul odour. Occasionally there is a tendency to spontaneous cure, but the disease may persist for years and a malignant neoplasm may develop in the infected area. Histologically the condition is a simple papilloma, and the submucous area is not involved. The condition is not acutely contagious and as a rule no special measures are necessary to prevent transmission of the disease, apart from strict cleanliness and cessation of sexual intercourse.

Treatment.—It is usually advisable to control pyogenic infection of the area by frequent bathing, hip baths, and the use of antiseptic and astringent dusting powders. Females suffering from vaginal discharges show some improvement if the leucorrhœa is controlled by douching, antiseptic or caustic applications to the cervix and frequent dusting with an astringent powder such as "dermatol" (bismuth subgallate). In male cases the prepuce is retracted as fully as possible, the area is bathed with eusol and dried, and powder applied lightly, then a thin fold of gauze is placed round the glans and the prepuce replaced. This dressing should be changed frequently. After a few days the warty masses should be destroyed with the aid of an anæsthetic. If the area is small subcutaneous infiltration with 3 per cent. novocaine suffices, but with extensive areas, general anæsthesia is preferable. An electric cautery or a diathermy knife, or high-frequency fulguration may be employed. The entire area involved must be destroyed down to the submucous tissue, and close attention is necessary to eradicate minute satellite warts around the main area. In the female the warty masses may be removed with a sharp spoon and the base cauterized. After operation simple antiseptic dressings are changed frequently, or tannic acid may be applied.

During pregnancy it is advisable to remove the warts during the early months of pregnancy, and if a vaginal discharge is present, this may be treated also. If the pregnancy is approaching full term it is still possible to remove the warts without danger, but every endeavour should be made to heal all raw areas before confinement. The warts do not appear ever to have been transmitted to the baby. If there are large masses of warts present, and if the area involved is difficult of access deep X-ray therapy is beneficial.

LYMPHOGRANULOMA INGUINALE

This condition is found mainly in the tropics and in the Mediterranean countries, but cases of infection are found among sailors and others who have acquired the disease in these countries, and a few cases occur when the infection has been acquired in this country. It has recently been established that this disease is due to a virus infection, and also that " climatic bubo," esthiomène, and fibrous stricture of the rectum are due to the same virus infection.

The virus cannot be demonstrated directly, but if material removed from the lesions is injected into animals characteristic changes occur which have been recognized as those due to virus infection. If a monkey is inoculated it dies in ten days, and at the post-mortem there is extensive meningo-encephalitis and gamma bodies have been demonstrated in the histiocytes.

In man the infection causes the following conditions: (*a*) Adenitis—affecting the inguinal and upper femoral glands. (*b*) Suppurative bubo. (*c*) Elephantiasis of the vulva (esthiomène). (*d*) Fibrous stricture of the rectum. By far the most frequent manifestation is inguinal bubo.

The incubation period is short. In some cases there is a primary ulceration of the genitals, usually slight and healing rapidly, but often the inguinal glands appear to enlarge without a genital lesion. The glands are large, discrete, slightly fixed, and only slightly tender on palpation. Usually several glands are involved and these may become adherent and a large irregular mass is formed. One or both inguinal regions may be involved, and the disease may be more advanced on one side than on the other.

After a variable period the glands tend to suppurate and point externally, discharging an odourless pus, which is occasionally blood stained. There is slight systemic upset, with irregular low fever. The suppurating bubo discharges for a considerable time—sinuses are formed and fresh glands may soften and suppurate and discharge. The changes appear to be confined to the inguinal group of glands. The glands eventually subside and the sinuses heal after a very chronic course. During the active stage of glandular enlargement and suppuration the blood shows a raised white count—often a leucocytosis of 15,000 or 20,000 per c.mm., and a relative increase of monocytes, up to 20 per cent.

Elephantiasis of the vulva is rarely observed in Britain. The labia are usually affected bilaterally and the posterior third is affected predominately. There are numerous small sinuses discharging pus, and the inguinal glands are enlarged. The disease has a chronic course.

Fibrous stricture of the rectum has often been attributed to syphilis, but many cases occur in which there is no other evidence of syphilis, and in a large series of proved cases of syphilis, stricture of the rectum is of infrequent occurrence. The specific test for lymphogranuloma inguinale has shown that most of such cases are due to this virus infection.

Frei's test.—This consists of the intradermal inoculation of sterile material derived from the suppurating bubo characteristic of the early stage of the disease. Pus is aspirated from a bubo with all aseptic precautions. It is tested for the presence of pyogenic organisms, e.g. staphylococci by culture. The material is treated for two hours at 60° C. on the first day and for one hour at 60° C. on the second day. The antigen is then tested again for sterility. An intradermal inoculation of 0·2 c.cm. of Frei's antigen is made on the forearm, and a control injection is made with sterile saline at a distance of three inches from the first. A positive reaction is indicated by the appearance within forty-eight hours of a papular reaction usually with a zone of erythema of one inch diameter. A positive reaction indicates the presence of, or a previous infection with, lymphogranuloma inguinale. A positive reaction can be obtained many years after infection with lymphogranuloma inguinale. It may be elicited throughout the patient's lifetime.

There are no serological changes recognized in lymphogranuloma inguinale. During the early acute phase of the infection there is a leucocytosis with relative increase of monocytes up to 20 per cent. of the white cells. The Wassermann and Kahn tests are negative.

Prognosis.—The early manifestations of lymphogranuloma inguinale can be controlled rapidly. The chronic lesions can also be relieved, but much slower improvement is observed.

Treatment. (a) *Specific.*—Treatment by intravenous or intradermal injections of Frei's antigen produces a rise of temperature, malaise and temporary exacerbation of the lesions followed by subsidence in 48 hours. The initial dose should be 0·2 c.cm. and subsequent dosage is determined by the reaction shown and the progress of the lesion.

(b) *Non-specific.*—Protein shock such as follows the intravenous injection of T.A.B. vaccine is probably the most valuable method of treatment. A course of six injections may be required and the initial dose consists of 50 millions organisms. Injections are given at intervals of three days and each injection should be about double the previous injection. A marked general reaction with rise of temperature to 103° F. is desirable.

Dmelcos vaccine (May and Baker) is also valuable as it produces in most cases an even more severe reaction than T.A.B. vaccine. The dosage for the initial dose is 150 million *B. ducrey.* It must be emphasized here that the *B. ducrey* has no specific relation to the manifestations of lymphogranuloma inguinale and the action of the vaccine is by virtue of "protein shock." Injections of antimony have a slight beneficial action. Antimony and potassium tartrate may be given by injection; 1 c.cm. to 3 c.cm. of 1 per cent. solution given intravenously rarely produces vomiting and may be given bi-weekly, fouadin—an organic antimony compound—may also produce slight benefit.

HERPES GENITALIS

This is due to the same virus as herpes febrilis and the manifestations are usually trivial though the source of much inconvenience or alarm. A crop of vesicles may appear on any part of the external genitalia, usually accompanied by slight burning or itching. These rapidly ulcerate and may heal in two or three days. Their appearance may follow the combined worship of Bacchus and Venus, and in such cases a suspicion of primary syphilis may be aroused. Certain individuals are subject to frequent recurrences of herpes genitalis.

Treatment consists of bathing the lesion with saline and applying an astringent dusting powder. In susceptible individuals attacks may be aborted by the application of surgical spirit to the affected part.

CHANCROID

Definition.—Chancroid (" soft sore ") is ulceration of the external genitals caused by infection by Ducrey's bacillus, usually running an acute course, and destructive of tissue.

Etiology.—The causal organism is specific—it is an anærobic bacillus—short—gram negative and difficult to identify and culture.

Incubation.—The incubation period is short and averages about 14 days.

Incidence.—The disease is relatively uncommon in Great Britain, but is common in Europe, especially in Mediterranean ports, and in the East. In Britain cases are not rare among sailors, and those returning from the East. Males are affected more frequently than females—extensive ulcers of the genitals due to thi infection are rarely seen in women.

Clinical characters.—There are usually several ulcers, often situated in the coronal sulcus or on the glans penis or on the inner surface of the prepuce. The body of the penis and scrotum are rarely affected. The disease is less frequent in the circumcised than in the uncircumcised. The ulcers are shallow, with undermined edges and angry red base; they spread rapidly; they are very tender when dressed, and fresh areas of ulceration develop rapidly by contact infection. The inguinal lymph glands are enlarged and tender, there is often redness and induration of the dorsal lymph vessels of the penis. The ulcers increase rapidly in size and may penetrate deeply, and a large area of the penis may be destroyed exposing the urethra. If the patient has a long and tight prepuce the ulcer may become gangrenous—there is great redness and œdema of the penis, and pain, and very extensive and rapid destruction of the tissue occurs—the condition of phagedena. This may extend from the penis to the scrotum and anterior abdominal wall.

Diagnosis.—In all ulcerative lesions of the genitals the first step is to exclude syphilis. The lesions are bathed frequently with saline, and saline compresses applied. On three successive days the fluid exuding from the ulcer is examined by the dark-ground illumination method for the presence of *Spirochæta pallida.* The blood should also be taken for the Wassermann reaction—in early syphilis the reaction will be negative, but the test must be repeated at intervals of 14 days until the end of 3 months from the appearance of the lesion.

The specific test for chancroid is Reinsterna's test. This consists of the intradermal injection of a vaccine of *B. ducrey* (e.g. dmelcos vaccine). An injection of 0·2 c.cm. = 45 million of dmelcos vaccine (May and Baker) is made in the forearm, and a control injection of

0·2 c.cm. sterile saline is made about 6 inches away. A positive reaction indicating chancroid infection consists in the production within 48 hours of an area of redness and swelling usually about 1 inch in diameter at the site of the dmelcos vaccine injection, and no reaction at the control area.

Prognosis.—If the nature of the ulceration is recognized early, rapid results are obtained, and healing occurs without extensive scars or deformity. The nature of the treatment usually incapacitates the patient for three weeks.

Treatment.—For local application mild antiseptic dressings are best—eusol baths and soaks repeated every four hours are effective. Specific treatment consists of injections of a vaccine of Ducrey's bacillus and is usually rapidly effective. Intravenous injections of dmelcos vaccine are given at intervals of 3 days and the dose is increased steadily. The vaccine is usually prepared in sets of six ampoules of increasing dosage and this is a reliable scheme of treatment. In some cases it is not necessary to give the complete series of injections—as soon as all the ulcers have healed the treatment may be stopped. Each injection is followed by pronounced general reaction, with pyrexia of about 103° F., and accordingly the patient has usually to be confined to bed throughout treatment. If dmelcos vaccine is not available, many cases respond to T.A.B. vaccine given intravenously in doses of 150 million, subsequent doses being increased according to the reaction to the preceding dose.

If phagedena threatens it is essential to secure free drainage—a dorsal or lateral slit of the prepuce should be performed under general anæsthesia. The ulcer is cleaned, and it may be cauterized with liquid phenol. When the acute infection has been mastered, a complete circumcision may be performed subsequently.

VENEREAL DISEASE IN CHILDREN

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SYPHILIS

MOST syphilis in children is of the so-called congenital type. Criminal assault and accidental infection by syphilitic adults are responsible for a few cases of acquired syphilis in which the disease takes much the same course as in adults. Whether or not syphilis is ever truly "congenital" i.e. associated with chromosome transmission, is at the present time a highly controversial problem. For all practical purposes most cases of "congenital" syphilis, are acquired at some period between conception and birth. Hence "prenatal syphilis" is by far the best term.

The vexed question of paternal or maternal transmission of syphilis is not yet settled. The paternal theory assumes infection of the ovum by means of infected spermatozoon and, if the recent evidence of granular stages in the life-cycle of the *Spirochæta pallida* be accepted, paternal transmission at once becomes a probability. At the present time, however, the concensus of opinion is in favour of the maternal transmission of syphilis. In other words a syphilitic child *always* connotes a syphilitic mother. The protagonists of paternal transmission have in the past placed great reliance on the fact that a syphilitic child may be born of an apparently healthy mother. Unfortunately, it appears that the *Spirochæta pallida* and the female live in a much greater degree of harmony or symbiosis than the spirochæte and the male. This is shown by the relatively milder course pursued by syphilis in women especially during the child-bearing years. Furthermore, pregnancy seems to exert a protective action against syphilitic manifestations. The diagnosis of latent syphilis is therefore frequently far more difficult than in the male. In fact syphilis in the female is often first recognized because of the birth of a syphilitic child.

PRENATAL SYPHILIS

Prevention.—While some cases of prenatal syphilis are due to inadequate treatment of adult syphilis, part of the responsibility for the emergence into the world of syphilitic children undoubtedly belongs to all those who fail to recognize that routine Wassermann reactions should be carried out upon every pregnant woman. In this way recognition of syphilis in the mother would lead to adequate treatment during pregnancy and it has been abundantly proved that such treatment almost guarantees a child free from syphilis however severe the mother's infection. In Denmark where routine serological tests are compulsory in pregnant women, there is said to be not more than 100 cases of prenatal syphilis in a total population of four million people. Even in women known to have had syphilis with adequate treatment and therefore apparently cured, it should be the rule that during every subsequent pregnancy treatment with arsphenamine and bismuth should be given. Only in that way can a syphilis-free child be confidently predicted.

Burke recommends three doses of arsphenamine per week—0·45, 0·3 and 0·25 gm. on say, Monday, Wednesday and Friday. This method enables a much greater total dosage to be given, and at the same time the expectant mother is less likely to develop intolerance than if one large weekly dose be given. The injections should be intravenous or, if that be impracticable, sulpharsphenamine should be given intramuscularly in doses of 0·45 to 0·6 gm. once weekly. Bismuth should be given in doses of 2 c.cm. once weekly or 1 c.cm. twice weekly. When there is intolerance to arsphenamine and bismuth, mercury may be used and should be administered in the form of colloidal mercury sulphide either intravenously or intramuscularly in two doses of 3 c.cm. each week. The course of treatment should be planned as follows and will be seen to last longer than pregnancy, which is important if the child is breast-fed :

Arsphenamine - - - - - -	13 weeks
Bismuth - - - - - - -	4 ,,
Arsphenamine - - - - - -	13 ,,
Bismuth - - - - - - -	4 ,,
Arsphenamine - - - - - -	8 ,,
Bismuth - - - - - - -	6 ,,
Arsphenamine - - - - - -	10 ,,
Total - - - - - -	58 weeks

Pathology.—The developing fœtus is so congenial a soil to the *Spirochæta pallida* that a child born with syphilis has aptly been described as a saturated solution of syphilis. The infection is essentially massive and accounts for the high morbidity of the untreated syphilitic fœtus. The earlier in fœtal life the infection occurs the greater is the load of syphilis but even if infection takes place in the later stages of pregnancy the weight of infection is far greater than in the adult.

Diagnosis.—In forming an opinion as to the probability of syphilis in a child it is important to pay special attention to the medical history of the parents. If the father has ever had syphilis the chances are high that the mother has been infected and inquiry should therefore be made with regard to previous pregnancies. There is a prevalent idea that syphilis in the female frequently expresses itself first by miscarriages, then the birth of macerated fœtuses, premature still-births, full-time still-births, full-time syphilitic infants, full-time apparently healthy but later syphilitic, and finally healthy children. This order of events is known as Kassowitz' law, and is probably of little value in the diagnosis of syphilis in the female. Stokes, for example, found that in 45 per cent. of his cases the first pregnancy produced a child who subsequently developed prenatal syphilis.

Diagnosis of prenatal syphilis in an infant born dead or dying soon after birth is of importance solely from the point of view of the mother, who may not hitherto have been suspected of syphilis. Scrapings of the umbilical cord should be examined by the dark-ground method, Wassermann and Kahn tests should be done on cord blood and specimens of liver, spleen and kidney of the dead infant should be stained for spirochætes which are specially abundant in those organs. Most children who develop signs of syphilis in the first few days after birth die. The organism is simply unable to support the hordes of spirochætes which inhabit it.

MANIFESTATIONS IN CHILDREN

The great majority of children suffering from prenatal syphilis do not present any signs before the third to the sixth week of life. The first signs are "snuffles" and cutaneous eruptions. The child is often irritable and restless and may scream when handled. Snuffles, due to syphilitic rhinitis, is characterized by profuse muco-sanguineous nasal discharge and may interfere so much with suckling as to lead to progressive loss of weight. The cutaneous manifestations take the form of an eczematous eruption at the angles of the mouth leading to fissuring, with the appearance in more severe cases of lesions on the palms, soles and perineum. Cutaneous syphilides in infants may be confused with urticaria pigmentosa which, however, is usually confined to the trunk and is very densely distributed. Moreover the skin when stroked shows the typical wheal of urticaria.

Lesions in the napkin area may also suggest syphilis but unless accompanied by cutaneous lesions on palms, soles and face should not be regarded as syphilitic.

Bone changes.—It may be noticed that whenever the child is lifted or handled it begins to cry or it may appear to have a paralysis of an arm or leg. Careful palpation of the long bones may reveal a definite swelling or area of tenderness. This is due to syphilitic osteo-chondritis and chondro-epiphysitis which can be demonstrated by X-ray photographs in which the appearances are pathognomonic. A diagnosis of prenatal syphilis can confidently be made even in the face of negative serological findings. In early cases the epiphysial line is thickened and irregular. When the condition is well-advanced the line is replaced by a zone of fatty degeneration. Involvement of the cranium is very uncommon in infants. Craniotabes and Parrot's nodes are usually due to rickets not syphilis.

Spleen.—70 per cent. of infantile syphilitics show an enlarged spleen before the fourth month of life.

Serology.—Blood may be obtained from the umbilical cord at birth and if the Wassermann reaction is positive both mother and child may be regarded as syphilitic. Later there should be no difficulty in obtaining at least 3 c.cm. of blood from a vein at the bend of the elbow, however young the child may be. The chief requisites are a first-class syringe (the Agla is by far the best), and complete confidence that every arm has a vein in or near the middle line even if none be seen or felt. Blood may also be taken from the superior longitudinal sinus by inserting a needle vertical to the skin at the posterior margin of the anterior fontanelle in the middle line. This method is obviously available only up to about the fifteenth month. Should the Wassermann and Kahn reactions be negative a diagnosis of syphilis is not necessarily precluded. Positive clinical and X-ray findings should not be subordinated to serological results.

Later signs.—Many children who start life infected with syphilis fail to show any signs of infection until later years, even in some cases as late as thirty. The classical manifestations are interstitial keratitis, saddle-nose, Hutchinsonian teeth and auditory nerve deafness. Any child exhibiting one or more of these signs may be regarded as syphilitic and in most cases the Wassermann and Kahn reactions will be found positive.

In many cases of undoubted prenatal syphilis, however, no one of these classical signs may be evident, yet it is often possible to make the diagnosis or at least become suspicious of the syphilitic taint merely from the facies. Description of the prenatal syphilitic facies is extremely difficult owing to the elusiveness of its characteristics, but anyone who has had the opportunity of studying typical cases may readily learn to differentiate it from the normal. There are doubtless in every big clinic numbers of unrecognized prenatal syphilitics without the classical signs who, having been found to give a positive Wassermann and Kahn reaction, have been placed on treatment and in the case of adults regarded as acquired syphilis. Their subsequent progress, especially the refusal of the blood to become negative, often confirms the impression conveyed by the facies.

Stokes in "Modern Clinical Syphilology," writes:

> "The difference between the normal and the prenatal syphilitic face does not depend upon any one feature but resides mainly in the upper part, above the upper lip and at times even above the tip of the nose. A certain touch of fulness and excess breadth and height to the forehead is an element, yet the rachitic and constitutional inferiority complexes may have it without giving the true impression. False impressions may be had by relying too much on the beetling or Olympic front. The essence of the matter lies in a certain inalertness, a sleepy, tired, fagged, clouded, dreamy or obscured appearance of the upper face; an appearance of veiledness as if a smudge had lightly swept across the brows and eyes and nasal bridge of a crayon portrait. It is possible to obscure the jaw and mouth with a card and still get the impression. Changes in expression and angle of inspection do not destroy it. Wile has laid stress upon the upward and outward flare of the nostrils which results from the depression of the nasal bridge and this is undoubtedly important. To me, however, the effect is produced more by the increased distance between the eyes. Neither corneal nebulæ nor teeth are essential. With the brows more accentuated and the eyes deepened, with the blue iris and black pupil in sharp contrast,

the facies becomes Celtic."

Such is Stokes' description of what should in virtue of the extreme aptness be known as the Stokes' facies.

PROGNOSIS

With the late appearance of the signs of syphilis the prognosis is generally good provided that adequate treatment is carried out. Obviously irreversible damage may have taken place which will always involve a greater or less degree of disability, e.g. defects of vision from interstitial keratitis or mental backwardness or paralysis from syphilitic lesions in the central nervous system.

TREATMENT

The proper time to begin treatment of prenatal syphilis is as soon as pregnancy is diagnosed. This, however, is a counsel of perfection which may require a long time to become a recognized procedure. Hence the problem of treating prenatal syphilitic children of all ages is one which will continue to require solution.

The general principles of treatment employed by Nabarro in the Venereal Disease Department of the Hospital for Sick Children, Great Ormond Street, consist in courses of arsphenamine by injection together with mercury in the form of the green iodide by the mouth. Such courses may be alternated with courses of bismuth by intramuscular injection during which mercury, of course, is not given. All courses whether of arsphenamine or bismuth are followed by a rest of one month at the end of which the Wassermann reaction is tested. Nabarro's practice is to continue treatment until the blood becomes negative and then to give two further courses of arsphenamine and mercury after which the blood is examined every three months for a year, then six-monthly for a second year and subsequently at yearly intervals. Careful watch is kept at each visit for signs of recurrence of such intractable conditions as interstitial keratitis.

Arsphenamine may be injected intravenously in children whose veins make the procedure reasonably safe or if preferred intramuscular injection may be used, the site being the buttock at a point about midway between the anterior superior iliac spine and the fold of the nates.

For intravenous injection neo-salvarsan "914" or its equivalents novarsenobenzol (N.A.B.) and neokharsivan may be used, and for intramuscular use the sulpharsphenamines are preferable, e.g. sulfarsenol, sulphostab, kharsulphan.

For infants the first dose may be 0·02–0·05 gm. increasing weekly up to 0·12 gm. for the eighth and last injection of the course. During this time the green iodide of mercury $\frac{1}{8}$ grain b.d. or hyd. c̄. cret. $\frac{1}{4}$ to $\frac{1}{2}$ grain t.d. should be given. The second course after a month's rest may begin with 0·06 gm. sulphostab or sulfarsenol and increase gradually to 0·18 gm.

In older children the first dose may be 0·06 gm. increasing to 0·18 or 0·24 gm. at the end of the first course. Subsequent courses may begin with 0·1 gm. and increase to 0·3 gm. or 0·45 gm. in later courses. This last dose should be regarded as the maximum for children under twelve.

The actual injection intramuscularly may be attended with considerable pain and it is the custom at Great Ormond Street to make use occasionally of the following solution :—

Chlorbutol	$\frac{1}{26}$ grain
Ethocaine hydrochloride	$\frac{1}{4}$ grain
Glucose solution, 55 per cent.	1 c.cm.

The drug for injection is made up in two or three c.cm. of this solution, and it is certainly very successful in those children who bear pain badly.

In older children when intravenous injections are easy, say at the ages of two to three years, the initial dose of e.g. N.A.B. or stabilarsan is 0·1 gm. increasing gradually to 0·25 gm. for the eighth injection. Still older children may start with 0·15 gm. or 0·2 gm. and rise gradually to 0·3 or 0·45 gm. which is the maximum for a child under twelve.

Bismuth is put on the market in many forms but one of the most satisfactory is the watery suspension of bismuth oxychloride which is also known as bisoxyl and chlorostab. This may be given in doses of 0·1 c.cm. as an initial dose for an infant weighing 9 lb., increasing up to 1 c.cm. for the ninth or tenth injection which is the end of the course. The urine should be examined every week as a routine and albuminuria indicates cessation of bismuth for the time being. In older children the dosage of bismuth may be increased to 1·5 c.cm. up to 3 c.cm. weekly, especially in cases which have shown signs of arsenical intolerance.

Of recent years an arsphenamine for oral administration has been extensively used in Germany with such apparently good results that many German clinics have ceased to use intravenous and intramuscular injection. The drug is variously known as spirocid, stovarsol, acetarsone, orarsan and undoubtedly renders the blood negative after one or two courses, but it is too early to be sure of the permanence of the anti-syphilitic effect. The dosage is calculated on body weight as expressed in kilogrammes and is $\frac{1}{12}$ grain per kilo. daily for the first week, $\frac{1}{6}$ grain per kilo. daily for the second week, $\frac{1}{4}$ grain during the third week, and $\frac{1}{3}$ grain per kilo. during the next six weeks. This completes a nine weeks' course after which a rest of four to six weeks is given. The courses may be repeated once, twice or more times if necessary. The drug is undoubtedly worth extensive trial, but is probably unsafe for the treatment of syphilis except in in-patients, in whom it is easy to be sure that the patients are actually getting their treatment. It is probably unsafe for out-patient practice owing to doubt whether the child is taking the tablets.

Lumbar puncture should be performed at the outset of treatment and if the cerebrospinal fluid gives evidence of syphilis, examinations should be repeated at appropriate intervals after completion of courses of treatment. It may be necessary in cases of neurosyphilis to use tryparsamide which is a pentavalent arsenical in contrast with those mentioned above which are trivalent. This drug may be given intravenously or intramuscularly, the dose being 0·5 gm. for a child of two to three years increasing to 1·5, 2 or 2·5 gm. for older children. Eight or ten injections may be given in a course and courses may be repeated several times. Since tryparsamide is a relatively weak spirochæticide it is often useful to give a course of bismuth along with tryparsamide.

GONOCOCCAL VULVO-VAGINITIS

Many of the cases of vaginal discharge in children brought to the notice of the physician are really due to lack of local cleanliness, to worms or infection with intestinal organisms and as a general rule they clear up rapidly after attention to the causative factors. In the case of gonococcal vulvo-vaginitis, however, chronicity is the rule whatever treatment is adopted in the way of douching and application of antiseptics. It is a disease which has always induced a state of profound pessimism in those called upon to treat it. Recently, however, a brilliant application of new knowledge of hormone action has provided a very promising therapeutic weapon. The rationale is as follows: (1) The vaginal epithelium prior to puberty is columnar and after puberty it becomes stratified. (2) Columnar epithelium in the genito-urinary tract is notoriously vulnerable to the gonococcus. (3) In the adult the vaginal epithelium is rarely infected by the gonococcus. (4) The female sex-hormone—œstrin—which is elaborated by the ovary, has the property of causing proliferation and stratification of the vaginal columnar epithelium. It is undoubtedly true that a child with severe gonococcal vulvo-vaginitis with profuse purulent vaginal discharge will, when placed on œstrin treatment, show within about a week apparently complete disappearance of the condition. The pus and gonococci disappear from the discharge which now consists only of the whitish epithelial flakes characteristic of the action of œstrin.

The dosage is 3,000 to 4,000 units daily by the mouth. In the form of menformon (Organon Laboratories) œstrin is put up in tablets of 1,000 units (red) and 3,000 units (green). The tablets appeal to children as much as any sweet, and are intended to be chewed not swallowed whole. Actually children are always pleased to receive their " sweets."

Unfortunately the brilliant promise of œstrin treatment for gonococcal vulvo-vaginitis has not been entirely fulfilled. Some cases relapse rapidly when the œstrin tablets are discontinued, and there is a return of purulent discharge containing gonococci. It is doubtful if the traditional belief in the immunity of stratified vaginal epithelium to the gonococcus is justified in view of a recent paper by King and Mascall of the London County Council Whitechapel Clinic. They present convincing evidence of undoubted gonococcal vaginitis in the adult. Nevertheless anyone who has had experience with this treatment must recognize that it has many great advantages over the older method of treatment. No other procedure will so quickly cause disappearance of purulent vaginal discharge and render the discharge free of gonococci even if subsequent events prove that gonococci were still left alive in the vaginal epithelium.

The therapeutic effect of œstrin in this condition is a boon to the patient and the attendants who are no longer compelled to perform inefficiently whatever was ordered in the way of irrigations and douching. It is also probably of the greatest use from the public health aspect in reducing the infectivity of the disease which is so often a source of worry to those responsible for large groups of children.

CANCER OF THE RECTUM

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ETIOLOGY. In recent years knowledge of the origin and progress of rectal cancer has made great advances. This is largely due to the valuable work of Cuthbert Dukes[1] and Lockhart-Mummery[2]. It is now recognized that, as in the case of the breast, carcinoma in the rectum has definite pre-cancerous manifestations. It is also well-established that hyperplastic epithelial nodules give rise to adenomas, sessile or pedunculated, and that these are frequently multiple. In many instances even when an adenoma is quite small early malignant changes have been observed on histological examination, and a number of cases of more than one malignant growth associated with multiple adenomas are on record. There is now abundant clinical evidence in support of the view that adenomas are often the precursors of adeno-carcinomas. Lockhart-Mummery carried out a follow-up of fifty cases of adenoma of the large bowel. In twenty-five of these another tumour had developed and in twelve of them malignant growths subsequently appeared. In many of the cases there were repeated recurrences.

At St. Mark's Hospital an investigation with the aid of photography is now being carried out to ascertain if one histological type of adenoma is more prone to recur and to develop malignant change than another, and if there is a recognizable type which shows no tendency to recur or become malignant. It sometimes happens after a rectum has been successfully removed for carcinoma that years later a secondary malignant growth arises higher up in the colon or in the blind end of the colostomy, and in such instances evidence may often be obtained of associated adenomas.

I recorded a case[3] in which I excised a rectum in 1920 for a malignant adenoma associated with multiple innocent polypi (the specimen

has been preserved in the Museum of St. Bartholomew's Hospital). In 1928 I removed two small adenomas from the colostomy stump of the same patient, and in 1929 a carcinoma developed in the same situation.

In another instance in 1923[3] I removed a villous tumour surrounding the lower end of the rectum by a resection of the lower four inches of the mucosa with suture of the upper cut end to the anal margin. The specimen has been preserved and the section shows that it is an innocent tumour. In 1930 this patient noticed a hard nodular induration round the anal margin at the old line of suture which proved to be an adeno-carcinoma infiltrating the subcutaneous tissue and not involving mucosa. This seems to provide good evidence that an adenoma with malignant potentialities can develop into a carcinoma after implantation. Both these cases illustrate the long latent period so characteristic of malignant disease.

A general diffuse multiple adenomatosis of the colon and rectum may occur as a hereditary disease running in families, transmitted by both sexes and occurring in both. Hæmorrhage often causes a fatal issue and the majority of those who survive this complication die of malignant disease of the bowel. Families so afflicted tend to die out.[4]

In experimental work with mice the development of malignant disease in one area of the skin appears to induce a systemic resistance, so that it is difficult to induce cancer in the same way in another area. The comparative rarity of multiple malignant tumours in man is in some degree clinical evidence in support of this. On the rare occasions when multiple malignant tumours occur in the large bowel it will usually be found that there are a number of associated innocent tumours. In these exceptional circumstances it is reasonable to suggest that the epithelium of the large bowel is potentially malignant and to such an extent that the secondary resistance is broken down, due perhaps to a strong hereditary influence. On the other hand it is rare for multiple tumours to appear simultaneously in any given tarred area in mice, although the removal of one malignant tumour is frequently followed by the development of another; this also suggests that a certain inhibition is produced when a malignant tumour develops, which is obviated when that tumour is removed. Clinical evidence with rectal cancer supports this view. The development of a secondary tumour in the rectum after a local removal of a primary tumour is usually regarded as a recurrence. It, however, seems more likely, especially when the site of the two tumours does not correspond, that the inhibition produced by the original tumour in a potentially malignant rectum has been removed with the tumour.

THE SPREAD OF CANCER OF THE RECTUM

Histological investigation of a considerable number of excised rectums has established the fact that only in rare instances does cancer of the rectum spread by the lymphatic stream beyond the rectal wall before it has penetrated that wall.[5] Although this is definitely true with regard to lymphatic spread it is not so certainly true with regard to spread by the blood stream. Clinical evidence supports the view that vascular invasion is usually late and occurs either *pari passu* or subsequent to lymphatic spread, but at the present time there is not sufficient histological evidence available to confirm this fully. Without doubt it sometimes happens that a venous invasion occurs and gives rise to metastases in the liver before a growth has advanced to that stage when visceral metastasis may reasonably be expected. Figures based on a large series of cases, investigated histologically, make it possible to predict after removal of a malignant rectum the chances of a cure, or probable length of life, in terms of percentages according to the anatomical and histological grading of the tumour and the extent or otherwise of lymphatic spread. The possibility of vascular invasion having occurred at a comparatively early stage of the disease is the only uncertain factor.*

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* This subject is now under investigation by Mr. Cuthbert Dukes in the Cancer Research Department, St. Mark's Hospital.

At St. Mark's Hospital cases of rectal cancer have for ten years been graded on an anatomical basis.

"A" cases are those which have not penetrated the muscular wall; "B" are those which show evidence of penetration but no evidence of lymphatic invasion; and "C" those which combine penetration with lymphatic spread. As this classification has now been adopted for a considerable time the follow-up of cases shows its value in prognosis. The operative mortality of the "A" cases is negligible and a permanent cure may be expected after radical surgery. Results are less promising both as regards mortality and end-results in "B" cases, and much less in "C" cases.

A system of histological grading is also adopted according to the degree of cell differentiation.

Four grades are recognized from highly differentiated, almost normal epithelial type to undifferentiated type of anaplastic tumour, happily quite rare. Most cases fall into group 2, a group in which about half the cells are differentiated.

The follow-up of cases graded histologically shows that the degree of malignancy of the tumour profoundly influences prognosis just as the anatomical grading markedly influences end-results.

An anatomical and histological examination in the research department at St. Mark's of rectums excised by the perineal method gave the following figures:

Out of 451 cases 16 per cent. were "A" cases, 35 per cent. were "B" cases and 49 per cent. were "C" cases. Of these 91 per cent. of the "A" patients were alive and well after 5 years, 71 per cent. of the "B" cases and only 17 per cent of the "C" cases. It is interesting to note that the histological grading falls into line with the anatomical when end-results are considered. In a series of 433 cases, 100 per cent. of the grade 1 patients (19 in number), i.e the well differentiated, were alive and well after three years; 67 per cent of the second grade (252), and 22 per cent of the third grade (107), and none of the fourth of which there were only four. Of the colloid cases (51) 17 per cent survived the 3 years. Colloid cases can be cured if operated on early, but they grow so rapidly that the opportunities for a radical cure are few.

Those who are interested in this subject should consult an excellent article by Gabriel, Dukes, and Bussey on lymphatic spread in cancer of the rectum.[6]

DIAGNOSIS

Cancer of the rectum in its earliest stage, provided that it does not encroach on the anal canal, is painless and gives rise to few if any noticeable symptoms. While it remains a purely local disease limited to the mucosa and submucosa, it can be treated surgically with complete success if only competent advice is sought. Too often it happens that the early symptoms of the passage of a little mucus, sometimes bloodstained, suggest to the patient that he is suffering from piles, and if he seeks medical advice it too often happens that treatment is given without a thorough rectal examination.

At St. Mark's Hospital the majority of patients with carcinoma of the rectum applying for treatment, do so when the disease is so advanced that there is little or no hope of cure by radical surgery. In the ten years 1910-20 the operability rate was only 41 per cent.; in the next ten years the rate improved to 54 per cent. It must be admitted that these figures are unsatisfactory and a reproach to clinical diagnosis. It is unlikely that these figures will be greatly improved until it becomes the custom for those who have passed the meridian of life to seek an annual overhaul.

The disease, though usually met with between the ages of 50 and 70, is not at all infrequent in young people between 20 and 30, when it advances rapidly and soon passes beyond the range of radical treatment, and this fact emphasizes the necessity for systematic rectal examination in the presence of any rectal symptoms. As a rectal growth encroaches on the lumen of the bowel it tends to disturb the normal function of evacuation and the lower the growth in the rectum the more noticeable the disturbance. A sense of incomplete evacuation is frequently complained of and a return to stool may only produce a little coloured mucus and flatus with perhaps some blood as the patient strains to get rid of the tumour which gives him a sensation of retained fæces. These symptoms will vary considerably according to the situation and the size of the growth. Growths which are not protuberant and situated well above the anal canal may spread some distance round the lumen before giving rise to sufficient symptoms to attract the patient's attention, though sometimes a sudden and somewhat severe hæmorrhage may be a blessing in disguise.

Growths in the region of the recto-sigmoidal junction, though anatomically rectal, arise in a portion of the bowel which is surrounded by peritoneum and give rise to the same symptoms as a carcinoma of the sigmoid. Obstructive symptoms will predominate and may indeed be the first to attract attention.

As a growth advances it infiltrates its way through the muscular wall and then begins to invade the lymphatics in close proximity, and sooner or later becomes fixed to surrounding structures, the sacrum, levatores ani, prostate, or vagina. When penetration occurs the blood supply of the centre of the growth is often obstructed so that ulceration begins, which usually gives rise to a frequent desire to evacuate small quantities of fæcal-stained blood, pus and gas. It is in this advanced stage of the disease, unhappily, that so many patients first seek advice or obtain recognition after perhaps some months of treatment for piles, diarrhœa, colitis, constipation and the like without adequate rectal examination. When in the late stages a growth in the rectum makes contact with, becomes adherent to, or invades surrounding structures, the somatic nerves, as distinct from the sympathetic, are irritated and pain becomes a prominent feature. Even before this happens ulceration and secondary infection will tend to produce much wind, and the rectal distension which may follow will excite pain. It cannot be emphasized too often *that pain is a late symptom.*

Rectal growths as they advance tend to surround the lumen of the bowel and gradually to constrict and obstruct it. At the recto-sigmoidal junction and at the ano-rectal junction this happens more rapidly than in the wide ampulla. It is only when this stage is reached that constipation, alternating with diarrhœa, occurs, a syndrome which is emphasized in many books as an aid to diagnosis rather than as a symptom of advanced disease, just as too much prominence used to be given in the past to the symptoms of peritonitis in the diagnosis of a perforated viscus.

The size of a growth is not always a true guide to the length of time it has existed. Occasionally a carcinoma will grow freely in the mucosa and submucosa, as a large projecting growth without much induration or muscular infiltration, a villous type, which is favourable for radical cure: in other instances downward spread takes precedence of mucosa and submucosa, and penetration of the muscular coats may occur when a growth is comparatively small. There is a popular idea that ribbon-like motions are indicative of a rectal tumour. It is true that when a rectal cancer surrounds the lumen well-formed motions are seldom passed, but rather give place to broken loose fragmentary stools. The ribbon-like motions may indicate a stricture at the anus, but more often are due to a spastic over-powerful sphincter, which does not dilate freely on defæcation. When a rectal growth invades the anal canal then pain, tenesmus and irritative mucorrhœa become prominent and distress the patient. Sometimes when ulceration has occurred in an ampullary growth secondary infection gives rise to an ischio-rectal abscess and considerable pain results until the abscess is drained.

RECTAL EXAMINATION.

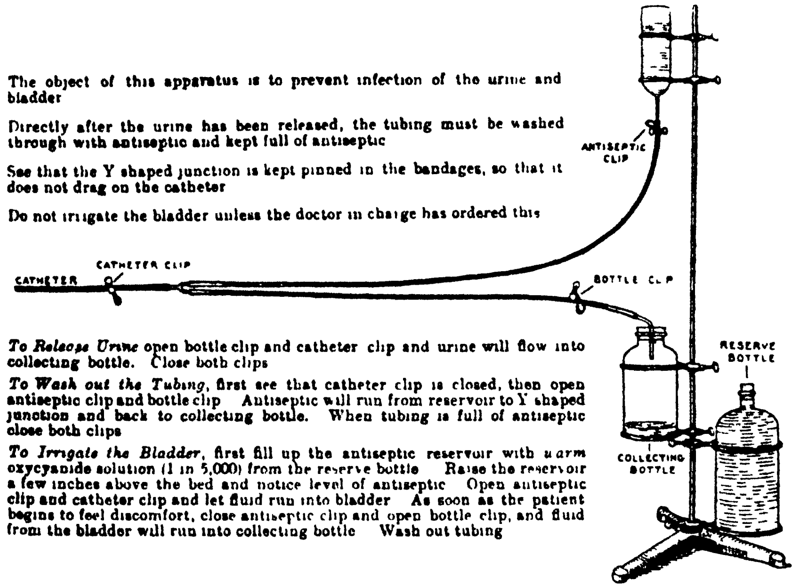
Digital examination, if not methodical, may easily miss a small growth within reach of the finger; growths which are just beyond reach may often be felt if the patient is urged to strain down. Bimanual examination may reveal a growth which is beyond reach of the finger, especially when an anæsthetic is given to relax the muscles. It is unfortunate that nearly half the growths which arise in the rectum are in the region of the recto-sigmoidal junction and beyond the reach of the finger, and a sigmoidoscope is required to establish a diagnosis. A sigmoidoscope should be as much a part of the essential equipment of the practitioner as a stethoscope or ophthalmoscope. If it were more generally used and more in request, no doubt it would soon become less expensive to buy.

X-rays are seldom required in the diagnosis of rectal growths. The removal of small portions of growth for histological section probably encourages metastasis and is neither necessary nor desirable, and may easily be misleading when an adenoma has developed early malignant change in one part of the tumour only.

TREATMENT

When a diagnosis of cancer of the rectum has been made and the patient is fit for surgery, radical measures should be urged. When, however, the growth is advanced a decision will have to be made between radical and palliative treatment. A growth surrounding the bowel and fixed to adjacent viscera or to the pelvic wall, will seldom be suitable for radical treatment; but between the operable and inoperable there are many cases grouped as " border line." In such cases the decision will often depend on the age and general condition of the patient, especially with regard to the kidneys, heart and lungs, and on whether or not the patient has lost weight, is anæmic or has that sallow complexion which is so suggestive of secondary deposits in the liver. Often the deciding factor may be whether the patient is stout and flabby or thin and firm. The presence of free fluid in the abdomen, an enlarged palpable liver, an accumulation of scybala in the colon, visible peristalsis or a distended cæcum are indications that an exploratory operation with a colostomy are required, when a decision can be arrived at, according to the conditions found, as to the chances of an excision being feasible or desirable at a later date.

In general, other things being equal, more risk can be taken with a stout female than a stout male. Age in itself, if general conditions are good, is no bar to a radical excision. An investigation of renal function (blood urea and urea clearance) in border-line cases, especially in the aged, is most important. An unfavourable report is often a definite contra-indication, because cystitis and urinary troubles so frequently complicate excision of the rectum and it may take even a pair of healthy kidneys all their time to weather the storm. The St. Mark's apparatus (see Fig. 1), as designed by Cuthbert Dukes, should be employed in all male cases, as it has been found at St. Mark's markedly to reduce urinary complications and to lower the mortality of excision of the rectum.



The object of this apparatus is to prevent infection of the urine and bladder

Directly after the urine has been released, the tubing must be washed through with antiseptic and kept full of antiseptic

See that the Y shaped junction is kept pinned in the bandages, so that it does not drag on the catheter

Do not irrigate the bladder unless the doctor in charge has ordered this

To Release Urine open bottle clip and catheter clip and urine will flow into collecting bottle. Close both clips

To Wash out the Tubing, first see that catheter clip is closed, then open antiseptic clip and bottle clip Antiseptic will run from reservoir to Y shaped junction and back to collecting bottle. When tubing is full of antiseptic close both clips

To Irrigate the Bladder, first fill up the antiseptic reservoir with *warm* oxycyanide solution (1 in 5,000) from the reserve bottle Raise the reservoir a few inches above the bed and notice level of antiseptic Open antiseptic clip and catheter clip and let fluid run into bladder As soon as the patient begins to feel discomfort, close antiseptic clip and open bottle clip, and fluid from the bladder will run into collecting bottle Wash out tubing

FIG. 1.—St. Mark's urinary apparatus.

Palliative treatment.—The value of a colostomy for relief of the distressing symptoms of an inoperable growth needs no emphasis. It is a mistake to suppose that the inconvenience of a colostomy is worse than the constant desire to evacuate blood and mucus per anum by night as well as day. A well-managed colostomy, washed out daily, seldom incommodes a patient once the toilet is complete, and most certainly prolongs life if not delayed too long. On the other hand, some cases are so advanced that the prospects of life are short and yet there is an absence of distressing symptoms and no immediate threat of oncoming obstruction. In such instances a masterly inactivity may be the wisest course to pursue.

Injection of absolute alcohol for relief of pain.—When, despite colostomy and other measures for relief of the patient's distress, pain is severe and persistent, great benefit often results from the injection of absolute alcohol 0·9 c.cm. into the spinal canal between the 4th and 5th lumbar vertebræ. The patient is placed face down on the table with pillows under the pubes so that the shoulders are lower than the site of injection. Cerebrospinal fluid is allowed to rise to the top of the cannula before the alcohol is slowly injected. The patient is kept in this position for ten minutes. The skin round the anus at a radius of from 3–4 inches becomes anæsthetic and in most instances rectal pain ceases. No untoward symptoms have occurred, though a warning must be given as to sexual functions, and a repetition of the treatment may be required after a few months.

Radical treatment.—A two-stage radical operation is more generally favoured than a one-stage at the present time. Preliminary colostomy with a fortnight's interval is followed by a radical excision which may be either from below for a low growth, i.e. the perineal excision with closure of the upper end, or by a combined perineal and abdominal excision for high growths. Some surgeons employ a combined operation for all growths. The combined operation may be begun via the abdomen and finished by the perineum, or vice versa. Both operations are equally radical. Whichever method is employed the mortality is considerably higher than for the perineal. The mortality of the operation, however, varies considerably with the experience and skill of the operator. Those who perform these operations frequently will admit that their mortality rate diminishes with increased experience, but that the minimum rate remains high. Although the abdomino-perineal has held the field for a long time, it seems probable that the perineo-abdominal, introduced by Grey Turner, Gordon-Taylor and, more recently, by Gabriel and others, will become increasingly popular and prove to have a lower mortality rate than its predecessor, because it is less productive of peritoneal shock. There is little doubt that the patient benefits if the combined operation is done in two stages, and that more survive.

The abdomino-anal operation.—A combined operation, which re-establishes a perineal anus by bringing down the proximal end after an excision, was in some favour in England some twenty-five years ago, but was then discarded by most surgeons. Recently there has been a revival of this type of operation, and it is once again on trial. If the technique can be perfected so that the operation is thoroughly radical, and at the same time a good functional anus can be secured without serious risk of interference with its blood supply, then this operation will attract more and more attention in the future.

Conservative resection.—Grey Turner and others, in carefully-selected cases, not too advanced, and neither too high in the rectum nor too low, have revived and modified the Kraske type of operation under the title of " conservative resection," i.e. a segmental resection from behind with anastomosis. No doubt many early cases can be cured in this way, but it is often difficult beforehand to assess the suitability of a case for this operation and that is the crux of the situation.

Ultimate success or failure must depend on the judgment and experience of the assessor.

Radium treatment.—Some few years ago certain high hopes for the use of radium were inspired by some primary successes with interstitial irradiation combined with the surgery of access, successes which ultimately proved in most instances not to be lasting. Unhappily, prolonged experience by the author, employing varying methods both with radium and radon in over 150 cases, chiefly inoperable, has shown that the action of radium on adeno-carcinoma of the bowel is too variable and the technique often too difficult to secure a uniform distribution in any but small growths, to justify its use in preference to surgery, unless surgery is contraindicated on grounds of general health or is resolutely refused by the patient. Nevertheless, some lives have been saved by radium in cases regarded as inoperable, which were otherwise doomed, and six patients with inoperable growths have been shown by the author at the Royal Society of Medicine,[7] who, after radium treatment, were alive and well and free from signs of disease, at intervals ranging from 7¼ to 4½ years. Although these six cases represent a small percentage of the total treated, they do show that it is possible, though difficult, to effect an apparent cure in this way. In early cases of squamous carcinoma of the anus radium probably holds the field. These cases can often be cured without mutilation and a colostomy avoided. In late cases radical surgery should be performed.

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FURTHER EXAMPLES OF THE MISUSE OF COMMON REMEDIES

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IN a recent article in this Journal the misuse of some common remedies was discussed.[1] Here further examples will be given.

Alcohol.—There is now no reason for any confusion of opinion regarding the action of alcohol. If the results of its continued excessive use be excepted, its main effects are on the nervous system. These are essentially sedative and not stimulant, any apparent stimulation being due to the removal of inhibitions normally exercised by the higher centres. As a sedative, it has a distinct place in medicine, for in anxious or febrile patients distressing symptoms can often be relieved and sleep secured by its judicious use. Any good it does in pneumonia is almost certainly due to such an action, and it probably does not influence the eventual course of the disease in any other way. It is definitely not a direct cardiac or respiratory stimulant, and the reputation it enjoys as a restorative in simple vasomotor faints is due entirely to reflex medullary stimulation resulting from the local irritation it produces in the mouth and throat. As a food alcohol has a real value, for it has a high calorie content and is readily absorbed without the need of previous digestion. Needless to say, this use should be limited to occasions when the assimilation of other foodstuffs is difficult.

Purgatives.—No drugs are more misused than these. Colossal quantities are used daily, not only by an ignorant laity in self-treatment, but also by the profession in private and hospital practice. There are many causes of habitual constipation, but it cannot be laid down too strongly that the majority of cases can, and should, be cured without recourse to purgatives. There is an ingrained belief in doctors and laity alike that the bowels should be relieved regularly once in twenty-four hours. Yet, as Gee pointed out over thirty years ago, this is not a law of Nature, and some people feel in better health when they act only once in two or three days. In many who complain of constipation the fæces arrive normally at the pelvic colon, but subsequent evacuation is not adequately performed. Rarely, this may be due to stricture of the rectum, and occasionally to weakness of the voluntary muscles of defæcation, but the chief cause is failure to cultivate a regular habit as the basis of a conditioned reflex. An ever-increasing bulk of fæces is thus required to produce the necessary stimulus, and in the end the reflex is practically abolished. What is needed in these cases is not a purgative—it is illogical to stir up some twenty feet of intestines to empty the last foot—but chiefly advice upon the prime value of the regular habit.

In one fairly common type of constipation of nervous origin, namely, that due to a spastic colon, purgatives are contra-indicated since they tend to increase the spasm. In another type of constipation which is associated with atony of the colon, although purgatives may be necessary for a time, and even indefinitely, much can be done by a suitable diet, regular exercises specially directed to the strengthening of the abdominal muscles, massage, and the administration as a lubricant of liquid paraffin. This and the salines excepted, all purgatives are irritants, and we believe that their habitual use leads to much more harm than constipation. As a matter of fact, there is little or no evidence to support the widely-held theory that auto-intoxication results from the latter. Fæces, after all, are meant to dry in the distal colon, and toxic absorption can occur much more readily from fluid fæces than from dry scybala. It seems likely, therefore, that those who set out to prevent it by the use of purgatives are actually thereby encouraging it. Dehydration by purgatives as a pre-operative procedure is to be condemned on many grounds which need not be considered in this article. Finally, attention must again be drawn to the appalling danger which arises from the routine administration of a purgative to any patient who complains of abdominal pain, and especially in the case of a child. A mild appendicitis may thereby often be converted into a fulminant one.

Iodine in thyrotoxicosis.—Iodine does not cure toxic goitre. Though for some unknown reason it tends to abate the high basal metabolic rate, the tachycardia, and other symptoms of thyrotoxicosis, these effects are only temporary. Given before and immediately after operation, it is of the greatest value, and its use should be restricted to these periods. The widespread practice of giving it continuously for months or even years in the belief that it cures, is deplorable, for thereby operation tends to be postponed until either auricular fibrillation, congestive heart failure, extreme emaciation, or a psychosis supervene; and it is becoming more and more evident that subtotal thyroidectomy is by far the best treatment for almost all cases.

Quinine.—In medicine, as opposed to obstetrics, quinine has a precise therapeutic value in malaria, as a bitter, and in the treatment of varicose veins. Otherwise its chief pharmacological effects are those of a general protoplasmic poison. It is still used a good deal as an antipyretic, but if it were more widely appreciated that the lowering of temperature which it produces is due to its poisoning effects on the general metabolism, and that, in addition, it checks the activity of leucocytes, its use as such would be discontinued, and especially if fever be regarded as a beneficent reaction to infection. *Quinidine*, which has a much more powerful effect than quinine in arresting auricular fibrillation, has the same toxic action: indeed, its action upon auricular muscle is essentially a toxic one. Though beneficial in properly chosen patients, its use in auricular fibrillation needs the greatest care and judgment; even so, its good effects may be only temporary and alarming toxic symptoms may sometimes be witnessed.

Vaccines.—A belief in vaccine therapy has, in our opinion, been one of the greatest delusions of a generation. There is a rapidly increasing body of opinion that vaccines cannot confer increased resistance in established disease—and this after their almost universal trial over a period of some twenty-five years. In pyelitis due to infection by the *Bacillus coli*, for instance, in which they were once believed to achieve dramatic success, time has proved them to be valueless. There are few now who regard them as anything but a danger in the treatment of acute and generalized infections, even if there are still a number who believe that they have a certain value in chronic and localized ones. This, however, is now becoming more and more doubtful. Only a few weeks ago, for instance, Maurice Shaw said that there was no sound evidence to show that they had any place in the treatment of either acute or chronic infective disease, and many others have written to the same effect. A point, too, that is often forgotten is that even in chronic infections they can do actual harm. Fishberg, for example, not only derided the idea that tuberculin had any value in the treatment of chronic pulmonary tuberculosis, but once more laid stress on the well-known fact that it might activate dormant foci of disease. The value of certain vaccines, e.g. "T.A.B.," when used prophylactically, is not, of course, denied. Indeed, in a condition such as rabies, in which the disease has a long latent period, the success of a vaccine is undoubtedly due to its prophylactic action.

Arsenic.—In the inorganic form arsenic has long enjoyed a reputation in the treatment of anæmias. In so far as pernicious anæmia was concerned, there was, perhaps, some reason for this, but since the introduction of liver its use in this disease is now entirely superseded. In the treatment of other forms of anæmia arsenic has even less claims for consideration. Its action in normal subjects is not to increase the production of red blood cells and hæmoglobin, but to cause proliferation of the leucoblastic part of the bone marrow and thus sometimes leucocytosis. There is nothing to point to its having a different action in these anæmias.

Calcium.—Calcium salts have a limited field of usefulness. Save in a few conditions such as tetany following thyroidectomy or occurring in idiopathic steatorrhœa, in which a real calcium deficiency prevails, there are no scientific grounds for its administration. Given by the mouth, enormous doses, e.g. calcium lactate, 5 grams, t.d.s., on an empty stomach, are needed to secure an efficient absorption from the gut. The doses usually given are quite useless. By intramuscular or intravenous injection only comparatively small doses can be given; still calcium introduced by these routes, e.g. an intravenous injection of 20 c.cm. of a 10 per cent. solution of calcium chloride given slowly, has sufficed to save life in tetany. Calcium has no effect on the course of active pulmonary tuberculosis, will not control hæmoptysis or other forms of hæmorrhage except perhaps post-operative hæmorrhage in jaundiced patients, and rarely, if ever, alleviates chilblains and varicose ulcers.

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SYRINGING THE EAR

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INDICATIONS FOR SYRINGING

WAX (Cerumen).—Wax is best removed from the human ear by syringing the meatus with a solution of sodium bicarbonate, 60 grains to the pint, warmed to 100° F. If the wax is hard and impacted, it is unwise to use force, because the small hairs in the meatus will have become firmly embedded in the mass, and forcible removal may lead to infection of the hair follicles and will certainly cause pain during syringing. The wax may be softened by filling the meatus with almond oil for ten minutes every night for a week beforehand. Alternatively, the mass of wax may be broken up by filling the meatus with 10 volume hydrogen peroxide, or acetone, for ten minutes beforehand. If the meatus is tender, pain can be relieved by filling the meatus for fifteen minutes with cocaine (alkaloid) 1 part, aniline 9 parts.

Foreign bodies.—Foreign bodies such as beads, pieces of match stick, peas, orange pips and occasionally flies or beetles, are found in the meatus. They occur more commonly in children and may cause intense pain. An attempt should be made to remove such foreign bodies by syringing with normal saline. The stream should be directed along the wall of the meatus which is not in apposition with the foreign body (Fig. 6).

If a live insect is present, this may be killed before syringing by dropping spirit into the meatus. If the foreign body is impacted in a child's ear, the meatus can be straightened out by pulling the pinna upwards and outwards (Figs. 3 and 4). Peas and beans tend to swell and are sometimes impossible to remove by syringing. They are best removed with instruments under anæsthesia.

Acute inflammation.—In spite of the fact that some textbooks advocate syringing the ear during the early stages of acute otitis media, in my opinion syringing an acute ear can serve no useful purpose, but, on the contrary, may lead to extremely dangerous complications. Pus should be gently mopped out from the meatus with small twists of cotton wool (Fig. 1). The stalk of the twist is held in the forceps.

FIG. 1.—Cotton-wool twist.

In acute otitis media, when the drum has been recently perforated, the infection is often confined by adhesions within certain limits in the middle ear. Syringing under pressure can easily force the infection into the epitympanic space or mastoid antrum.

Chronic inflammation.—Occasionally it may be necessary to remove desquamated epithelium and thick purulent discharge by syringing. This should always be done with extreme care, because solid particles may easily be washed through a large perforation in the tympanic membrane and may lodge in the Eustachian tube or additus. It is a far better principle to mop out all pus very gently with twists of cotton wool. Desquamated epithelium following skin infection of the meatus, occurring without otitis media, can be softened with almond oil and removed by syringing. Occasionally the complete cast of the tympanic membrane is shed. Collections of wax do not occur when pus is present in the meatus. Pus rapidly destroys and removes all traces of wax.

TECHNIQUE OF SYRINGING

(1) It is impossible for any patient to syringe his own ear with any degree of efficiency.

(2) Children can be divided into three classes—

Those who can be persuaded to allow the doctor or the nurse to syringe the ear; tiny children who must be held firmly during syringing; and cases in which a light general anæsthetic will be the only solution. The young child can be held sitting across the lap of the mother or nurse. The mother or nurse holds the head gently but firmly against her breast with one hand, and with the other controls the child's hands. It is important to get the child interested in the proceedings and thereby gain its co-operation. The external meatus in the child is narrow and curved (Fig. 3). The pinna must be pulled upwards and outwards to straighten the meatus (Fig. 4).

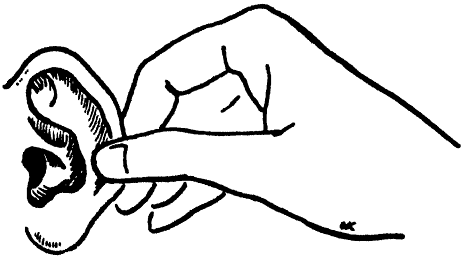

Fig. 2.—How to hold the ear in the adult.

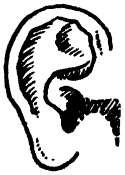

Fig. 3.—Direction of external canal in childhood.

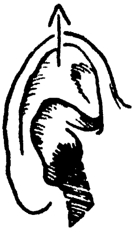

Fig. 4.—Traction upwards and outwards straightens out and widens the canal.

(3) In the adult the meatus is best exposed by pulling the ear backwards and outwards (Fig. 2). The patient sits sideways, with his ear on a level with the doctor's eye. A head-lamp, or mirror with reflected light, enables the doctor to see what he is doing and leaves both hands free. An aural speculum is inserted into the meatus and the wax or foreign body inspected. It will be assumed that the wax, if impacted, has been

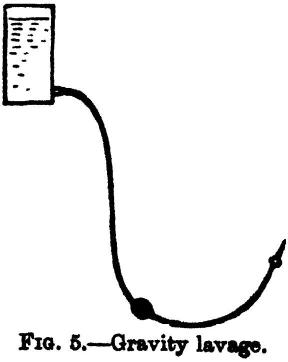

Fig. 5.—Gravity lavage.

already softened. For general purposes the best type of syringe is a rubber Higginson (Fig. 7) with a metal nozzle as shown in Fig. 6. The nozzle must be firmly attached to the syringe by tying it in with silk or wire; this will prevent the nozzle being forced out of the rubber tubing. The nozzle is held in the left hand (Fig. 7A) and the bulb grasped with the right hand (Fig. 7B). The other end of the syringe dips into the solution of sodium bicarbonate. Metal syringes are not nearly so satisfactory. It is true that only one hand is needed for a metal syringe and the other can be used for pulling gently on the pinna to open the

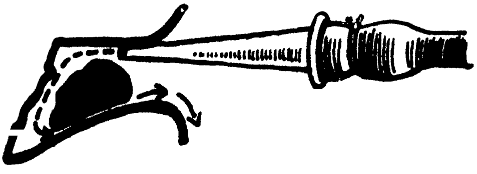

Fig. 6.—Direction of flow of fluid round wax.

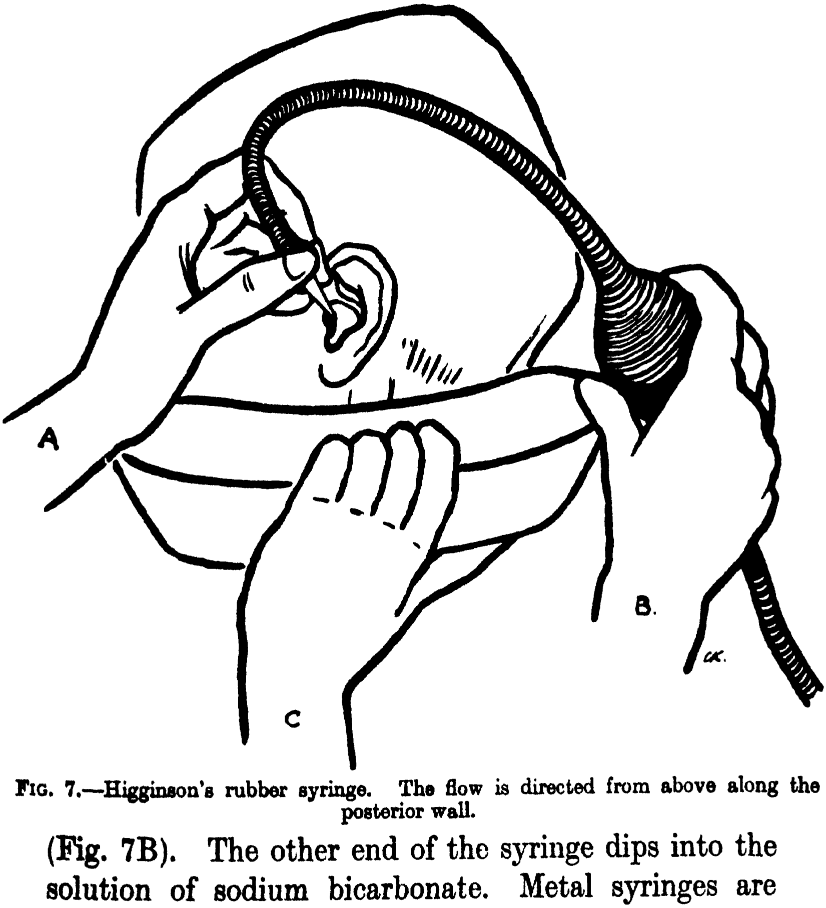

Fig. 7.—Higginson's rubber syringe. The flow is directed from above along the posterior wall.

meatus, but metal syringes tend to stick and jerk at the wrong moment. They have to be refilled constantly, and it is difficult to be certain that all air is expelled even if the nozzle is held upright, and a little fluid expelled, beforehand. With a Higginson syringe all air can be washed out beforehand, an even pressure is maintained, and the patient or a third party can hold the pinna. Care must be taken to see that the other end of the syringe does not come out of the solution. The end of the nozzle is placed just within the meatus and the flow is directed along the posterior wall (Fig. 8), but a glance at Fig. 6 will show that the stream is most efficiently directed along that part of the metal wall which is not in apposition with the wax or foreign body.

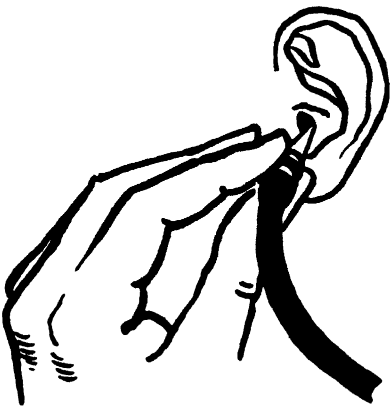

FIG. 8.—Flow directed from below along posterior wall.

Undoubtedly the best type of syringe is that shown in Fig. 5. This works by gravity and the vessel containing the solution can be placed at the desired height to give the correct head of pressure. The flow of solution is continuous, and the apparatus can be used with one hand leaving the other free to hold the ear. Slightly additional pressure can be brought to bear by pressing on the bulb occasionally, but it is impossible to use too much force with this syringe. Gentleness, patience and an occasional examination of the meatus with an aural speculum are essential. After syringing, the meatus should be wiped dry with twists of cotton wool (Fig. 1), and a drop or two of almond oil inserted if the removal of the wax or foreign body has caused any discomfort to the patient.

ACUTE ASEPTIC MENINGITIS

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THE importance of acute aseptic meningitis from the practitioner's point of view lies in the fact that while it closely resembles the almost universally fatal tuberculous meningitis it has itself invariably a good prognosis. Indeed, it is probable that some of the cases described as tuberculous meningitis were in reality cases of acute aseptic meningitis. Although sporadic cases have been recorded under various titles since 1900 it was not until 1925 that the disease was clearly described by Wallgren,[1] who reported an epidemic in Sweden of "méningite aseptique aiguë." Wallgren's paper, the more recent review of Viets and Watts[2] adding fourteen cases of their own and papers by Gibbens,[3] Collis[4] and others, have established the condition as a definite clinical entity. Nevertheless, it is not mentioned in most textbooks of medicine.

From some of the published reports the impression is gained that acute aseptic meningitis is entirely a disease of children. It can, however, affect adults. Thus at the North Middlesex County Hospital in the past three years there have been ten definite cases and two doubtful cases of this condition. The ages varied from 2½ to 28 years and five of them were over the age of 16.

The following is a brief account of two typical cases :—

M.W.P., female, aged 22. Three days before admission she developed abdominal pain, vomiting and stiffness of the neck, followed by severe headache. On examination there were definite signs of meningeal irritation, but no signs of a focal lesion of the central nervous system. The tympanic membranes were normal. The cerebrospinal fluid (C.S.F.) was turbid and contained 923 cells per cubic millimetre, of which 55 per cent. were lymphocytes. Protein 70 mgm. per cent., chlorides 720 mgm. per cent., glucose normal. No organisms grew on culture. Nine days later the C.S.F. was clear and contained 50 cells, mainly lymphocytes. The chlorides were 720 mgm. per cent. She made a complete recovery.

C.H., a male, aged 24. Two days before admission he developed severe frontal headache, vomiting and photophobia. On examination he was semi-conscious and showed marked neck rigidity. There was definite papillœdema which increased later. The tympanic membranes were normal. The C.S.F. was faintly turbid and contained 257 cells per cubic millimetre, mainly lymphocytes. Total protein 175 mgm. per cent., globulin ++, chlorides 700 and glucose 58 mgm. per cent. It was sterile on culture. Six days later the C.S.F. was clear and colourless. It contained 556 cells per cubic cmm., mainly lymphocytes. Total protein 175, globulin ++, chlorides 720 and glucose 55 mgm. per cent. Headache persisted for several weeks but he made a complete recovery.

THE CLINICAL PICTURE

From a study of these cases and the published records of others a definite composite clinical picture can be drawn. The patient is in good health without disease of the ears or nasal sinuses and with no history of injury or of contact with acute infectious disease. Suddenly he develops headache and the signs of meningeal irritation are apparent. These are insomnia, neck rigidity, Kernig's sign, bulging of the fontanelle in children, and certain ocular signs, such as squint, photophobia, nystagmus and papillœdema. The patient is very ill although the temperature is not very high. Then after an average duration of seven days the temperature falls by lysis and the whole condition subsides without sequelæ and recovery is complete in two to three weeks. The C.S.F. shows definite evidence of meningitis and certain features which help to distinguish the condition from other types of meningitis. The fluid is under increased pressure and may be clear and colourless or turbid. In some cases a clot appears. The total protein content is increased in amount and globulin is present. The cell content varies from 50 to 2,000 per c.mm. In the early stages polymorphophonuclear cells are found, but at the stage when lumbar puncture is usually performed lymphocytes predominate.

Cohen[5] has shown that in acute meningitis the composition of the C.S.F. tends to approximate to that of the blood plasma owing to altered permeability of the cells of the choroid plexus and to chemical changes in the plasma itself. Thus the chloride content of the C.S.F. falls and the protein content rises. Theoretically the glucose content should rise since it is normally higher in the blood than in the C.S.F. A transient initial rise may occur but usually the glucose is diminished possibly because it is utilized as a food by the exuded cells.

In acute aseptic meningitis, however, the changes in the glucose and chlorides are minimal and chiefly limited to some slight fall of chlorides. This point is an important distinguishing feature from tuberculous meningitis in which definite diminution of chlorides and glucose occurs.

The essential features of the disease may be summarized as follows:—(1) Acute onset of meningeal irritation. (2) Normal ears and nasal sinuses and no contact with acute infectious disease. (3) C.S.F. showing excess of lymphocytes, slight diminution of chlorides and no organisms on culture.

ETIOLOGY

Until 1934 it was thought that acute aseptic meningitis might be an abortive form of acute anterior poliomyelitis or of acute epidemic encephalitis. In spite of some clinical evidence in favour of this view, it is now generally agreed that it is a disease *sui generis* due to a distinct virus first discovered in 1934 by Armstrong and Lillie.[6] More recently Findlay, Alcock and Stern[7] have isolated a virus from two patients suffering from meningitis of unknown etiology and shown that when inoculated intracerebrally it causes a lymphocytic infiltration of the meninges of monkeys, mice, rats and guinea-pigs with a fatal result. Intraperitoneal inoculation in mice does not cause any symptoms but the virus is excreted in the urine. It can be isolated from apparently healthy mice and can pass through the scarified skin. In view of these findings it is interesting to note that some victims of the disease have lived in places infested with mice.

Now that the virus etiology of the disease is known the term "aseptic" is scientifically a misnomer. Strictly speaking serous meningitis and meningeal irritation in subarachnoid hæmorrhage might be more correctly termed "aseptic." Armstrong and Dickens[8] suggest that the disease should now be called lymphocytic chorio-meningitis.

DIAGNOSIS

When there is clinical evidence of meningeal irritation an examination of the cerebrospinal fluid is necessary since this method alone gives definite information about the condition of the meninges.

The following are the chief conditions which have to be distinguished from acute aseptic meningitis :—

(1) *Meningism.*—This occurs most often in children and may resemble meningitis very closely especially when it occurs before the underlying condition, usually an apical pneumonia, is apparent. Ryle[9] does not regard meningitis and meningism as contradistinctive terms and believes that every case of meningism has a mild meningitis. Meningism in his view is a reaction more delicate in its proclamation of the state of the meninges than the microscope and laboratory tests. Nevertheless, although the clinical resemblance to true meningitis is great the C.S.F. changes are distinct. In meningism the C.S.F. is often normal. There is no increase of cells or protein, but the chlorides may be slightly diminished due to a fall of the plasma chlorides by vomiting, starvation and ingestion of fluid.

(2) *Serous meningitis.*—Here otitis media is present and the meningitis affects only a localized area. The C.S.F. is clear and there is some increase of protein and cells. The chlorides are normal, suggesting that there is no general infection of the meninges. No organisms are present. The condition resembles acute aseptic meningitis in many respects, but there is a local focus of inflammation in the ear. Sometimes the term "serous meningitis" has been

loosely applied to both conditions, but it is usually understood to be a "méningite de voisinage" and may progress to suppurative meningitis.

(3) *Tuberculous meningitis.*—Here the onset is usually more gradual but the two conditions may resemble each other closely. The C.S.F., however, in tuberculous meningitis shows marked diminution of chlorides and glucose which is not seen in acute aseptic meningitis. Since tubercle bacilli may not be demonstrable in the C.S.F. in tuberculous meningitis, perhaps the most important differential feature is the course of the disease. Complete recovery is invariable in acute aseptic meningitis, whereas it is doubtful if any case of true tuberculous meningitis has ever recovered. Great caution is needed in making the differential diagnosis. Cases with meningitic symptoms which have passed off have been known to succumb shortly afterwards to definite tuberculous meningitis—the first symptoms being probably caused by a small isolated meningeal tubercle. Naucler[10] points out how careful one must be, and mentions a case called acute aseptic meningitis, which subsequently died of tuberculous meningitis proved at autopsy.

(4) *Acute anterior poliomyelitis.*—In the stage before paralysis comes on meningeal irritation may be prominent and except during an epidemic its true nature may not be suspected. The C.S.F. at this stage resembles closely that of acute aseptic meningitis. There is an excess of cells, lymphocytes predominating. The protein and globulin are increased and the glucose and chlorides are normal. The occurrence of muscle weakness or paralysis clinches the diagnosis since such sequelæ are unknown in acute aseptic meningitis. If paralysis does not occur the true nature of the disease may never be proved.

(5) *Mumps meningitis.*—Meningitis is the commonest neurological complication of mumps, but it is rare. It usually develops after parotitis is apparent, so that the cause of the meningitis is obvious. The C.S.F. shows a marked lymphocytosis. Sugar is normal and chlorides are diminished. Complete recovery is the rule. In some cases of mumps meningism without definite meningitis occurs.

(6) *Acute meningococcal meningitis.*—It is well known that in the early stages of this disease organisms may not be found in the C.S.F. The cellular response, however, remains polymorphonuclear and there is glucose and chloride depression. These features serve to differentiate the condition from acute aseptic meningitis.

(7) *Spontaneous subarachnoid hæmorrhage.*—When gross flooding of the subarachnoid space with blood occurs the clinical picture of very intense headache, particularly occipital, with meningitic signs and fundal hæmorrhages appears. Slight leakage of blood into the subarachnoid space from a congenital or "berry" aneurysm may simulate meningitis more closely since the symptoms are less marked. Thecal puncture reveals a uniformly blood-stained fluid and divides the diagnosis. If fluid is removed some days after the initial hæmorrhage the fluid will be yellowish and may contain flakes of fibrin.

(8) Sometimes cases of cerebral tumour and abscess may simulate

meningitis if no localizing signs are present. The clinical course of the disease and the C.S.F. findings are usually sufficient to distinguish them from meningitis.

TREATMENT

When the diagnosis of acute aseptic meningitis has been established symptomatic treatment only is indicated since there is no specific remedy and the prognosis is invariably good. Thecal puncture relieves the headache and may be repeated if it recurs. Before the help of the pathologist has been secured it may be wise to regard the condition as meningococcal meningitis and to administer anti-meningococcal serum intravenously with the usual precautions. It is best not to give serum intrathecally until the diagnosis is proved and the serum shown to be capable of agglutinating the organism. This objection does not apply to the more recently introduced meningococcal antitoxin of Ferry.

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THE DIAGNOSIS OF DIFFICULT CASES BY PSYCHOLOGICAL METHODS

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IN this article it is proposed to accept the definitions used by Riddoch[1] in his most helpful address upon this subject. The word " functional " is taken to refer to clinical states which are of psychogenic origin, and " organic " as indicating symptoms which result from morbid physical changes.

To the psychiatrist in the course of consulting practice there come two main groups of cases : (*a*) the frank, (*b*) the problem. By the adjective " frank " it is implied that the case lies definitely within the province of the psychiatrist, and the group comprises cases of : (1) psychosis—both major and minor; (2) psychoneurosis; (3) amentia; (4) behaviour disorder of a social or anti-social nature; (5) bona fide organic disorder for which, *faute de mieux*, psychological treatment of a symptomatic type is sought.

The " problems "—as distinct from the routine type of problem presented by the " frank " cases, comprise an anomalous group of cases in which a diagnosis has not been made. Before they come to try the resources of the psychiatrist they have already eluded that filter which the elaborate diagnostic methods of modern medicine supply. As might perhaps be expected, this group of cases forms a smaller proportion of patients seen in private practice than of those investigated at hospital. Many of the most insoluble problems in medicine come to the general teaching hospital for solution in one or more of its various departments, and of these cases a proportion gravitate in the last resort towards the psychological department. So the psychiatrist may have an interesting, if perplexing and onerous, function in the difficult matter of diagnosis, and a peculiar coign of vantage from which to survey the clinical scene. To him there may be sent the unrecognized organic case when, in its earliest phases of onset in a so-described "sensitive" individual, the manifestations are purely subjective, or, at the opposite extreme, there may come the condition which, though ultimately to prove of purely psychogenic origin, has threatened development of half a dozen different organic syndromes.

TWO GENERAL OBSERVATIONS UPON THE SUBJECT OF DIAGNOSIS

First, thorough clinical examination at the hands of the patient's own doctor, though a *sine qua non*, may, in the nervous patient, be difficult to make effective, and even fail in its object; this owing to a mistaken and misleading modesty and perhaps an actual, if unintentional, concealment on the patient's part. Thus two cases of anxiety neurosis recently seen proved to have comparatively simple, if by no means obvious, origins:

The first, a man aged 26, a woodworker in a large and successful furniture factory, was, in the letter of particulars sent by his practitioner, described as "a troublesome neurasthenic with innumerable and varied symptoms which I do not think I can better describe than is set forth in a list which I got the patient to make out himself and which I enclose." The enclosed list was lengthy and exhaustive, it mentioned a host of subjective sensations referred to various anatomical sites and physiological and psychological functions. When asked to express an opinion as to what he thought was the cause of his trouble, the patient answered with the two words, "mass production." Was this then going to be the classical case of an occupational neurosis, product of modern industrial methods and "the stress of modern life?" Evidently, for the patient enlarged upon this theme and the faults of the present social system; he believed that his workmates suffered the same ills as he. Nevertheless, the end-result of investigation was to discover a large swelling in the neighbourhood of the right testicle, which was diagnosed by the surgeon as a vaginal hydrocele and summarily dealt with. This disability proved to be at the bottom of the patient's complaint. He was under the impression that it had resulted from masturbation at an earlier age, and that it therefore represented some permanent self-inflicted injury. Concerning the whole matter he suffered an intense sense of inferiority, and was so sensitive upon the subject that it was the last thing he would be likely to mention to his medical man.

The second of these two cases is that of a married woman of 44 years, who was referred by her practitioner as a case of anxiety neurosis. In this case, too, there were the many subjective complaints in respect of which she had to all intents been adequately examined and observed. Eventually, it came out that she sometimes had what she described as a swelling which appeared in the left groin, and that this " fills up and won't go back." The patient knew sufficient to realize that this was a rupture and even that the fact that it did not always " go back " immediately was a serious matter; but she had not mentioned it to her doctor nor given him an opportunity of seeing it for, what might seem to us, the inadequate reason that it might mean an operation and, worse than that, a general anæsthetic which she imagined that she, like one of her relatives, might never survive.

The second general conclusion at which the writer arrived is the difficulty of excluding organic factors as a result of a purely clinical examination. Time was when the physician, as a result of what was described as " carefully running over " the patient, could with a certain amount of satisfaction feel that he had excluded organic factors. Now, in the days of earlier diagnosis, matters are difficult enough with the help of every pathological, chemical and bacteriological aid, and he is a bold man who relies upon clinical acumen alone.

CONDITIONS NECESSARY FOR A DIAGNOSIS OF " FUNCTIONAL "

These observations lead to a consideration of what are the postulates necessary to be satisfied before a diagnosis of " functional " can be established. Surely they are these: (1) The case must prove negative to all clinical and laboratory investigation. (2) There must be found a positive psychogenic basis. (3) The psychogenic factors must bear direct relation to the patient's symptoms.

Without the latter finding—and even with it—a diagnosis of functional cannot be made with any degree of certainty. The fallacy of the " all excluded " diagnosis, that is to say, a diagnosis of " functional " merely by a process of exclusion, is frequently apparent. The following clinical case may serve to illustrate this type of difficulty :—

A man, aged 35, was referred to the department of psychological medicine by the physicians; he was complaining of abdominal pain and vomiting. All investigations were described as being negative. The history was given that a Graham's gall-bladder X-ray test had been made on January 2, and that this had revealed a pathological gall-bladder. When the test was repeated on March 4, however, the gall-bladder was reported as being radiologically normal. Upon March 16 the patient was sent for psychological investigation. There appeared to be a marked neurotic element in his case. The patient himself described his sickness as being " not exactly vomiting, but I kind of bring my food back "—quite an apt description of vomiting of psychogenic origin. This he did some minutes after every meal. The personal factor was felt to be a strong influence in the case. The patient's mind was filled with the thought of gall-bladder disease, and for this reason it was felt that little reliance could be placed upon minute description of subjective sensations, including abdominal pains, which were described with all the unction and almost gusto of intense introspection, and could in the circumstances be readily explained as the product of auto-suggestion. Moreover, closer investigation as to psychogenic factors revealed the presence of mental conflicts adequate to account for the condition which had arisen. These were of occupational origin, and, as they were gradually externalized, they were interpreted by the patient as being the true source of his trouble. It was not surprising therefore that, *pari passu* with the progress of psychological treatment, the vomiting stopped, the man worried no more about his gall-bladder, but returned happily to work. On the following September 7, however, he again presented himself at the hospital. His whole manner and attitude were practical and businesslike; he was happy in his working conditions and displayed no neurotic sign. Nevertheless, his facies showed a slight icteroid tinge, he had lost weight, and there was no doubt about the pain in his right hypochondrium. To cut a long story short, the surgeons removed a gall-stone which was obstructing the lower end of the ileum.

PSYCHOLOGICAL INVESTIGATION AS A DIAGNOSTIC MEASURE

So far a few of the difficulties of diagnosis in general and of the label " functional " in particular have been noted, but what of psychological investigation as a diagnostic aid? Examples of its use, both direct and indirect, are numerous in recent medical literature. The subject may be considered from two aspects. In the first place, medical psychology has thrown light upon types of individual. This is, perhaps, no more than a modern development of Galen's attempt to correlate bodily states with the factor of temperament, but it has been extended and brought into prominence by the closer and more scientific studies of Kretschmer upon physique and character, and the suggestive conception of Jung upon temperamental types—to name but two of several well-known approaches. In a more special sense these trends have been carried by studies of the relation between emotional states and bodily mechanisms into investigations upon clinical entities. In this connection the work of Draper and Touraine[2] in America upon those suffering, and prone to suffer, from peptic ulcer and gall-bladder disease—the "ulcer race" and the "gall-bladder race," as they describe them—and later upon migraine,[3] the study of the late F. G. Crookshank[4] upon migraine, and the recent general observations of Millais Culpin[5] upon the emotional factor in gastric ulcer, are examples.

Secondly, the value of psychological investigation from the diagnostic standpoint may be viewed in its relation to the clinical problem as it presents itself in a particular individual. Leading psychotherapists from time to time quote cases which have been referred to them on apparently justifiable grounds, as being psychogenic in origin, but which on detailed psychological investigation become suspect of organic disease which ultimately declares itself. Jung[6] has claimed with adequate justification to distinguish, as a result of dream investigation in certain cases, the early foreshadowings of an organic illness. In this country, T. M. Davie[7] lately described a case in which he discerned dream interpretation as corroborating a neurological hypothesis. Culpin lays stress upon the important part which the patient, "the so-called neurotic patient," can play in distinguishing the subjective sensations of "functional" disturbance from those of "organic" disease; he calls attention to the "connection between the kind of patient and the kind of intestinal disorder," and cites three cases of gastric ulcer in which the medical psychologist was perforce the initial diagnostic agent.

The following case, though not alimentary in nature, may serve to illustrate the importance of not dismissing a patient's minute description as being only the product of an informed, but morbidly introspective, mind. This is described in detail because it illustrates the way in which psychological investigation may contribute to the business of separating the "functional" from the "organic," the psychogenic, as distinct from the pathogenic in a physical sense. The essential feature of this form of approach is the stress which is laid upon the subjective method—subjective, that is to say, not only in the sense that the patient's anamnesis must be noted with the greatest care, an indispensable adjunct to all case-taking, but also in the sense that the manner of the telling, the part played by emotional factors, and the mental attitude of the patient by whom the tale is told, are also observed.

On December 1, 1933, L. R., a master tool-maker, aged 48, was sent by his doctor for psychological investigation in respect of a supposed functional disability affecting his gait. The grounds of this diagnosis rested upon two main considerations. The patient had just been subjected to the most complete physical and neurological investigation and observation in hospital over a period of weeks, and there was no doubt whatever that no single scrap of organic evidence had presented itself, whether clinically or otherwise. Secondly, his own practitioner, to whom the patient had been known for many years, knew him to be a man of highly-strung temperament, as one who had lately had much possible source of internal mental conflict and who, being an individual of high intelligence and wide reading, had made a close study of his complaint in its medical and neurological aspects.

The patient's complaints were those of "difficulty in walking" and "inability to control the legs." He gave the following history: As a child he had been intensely nervous; he explained that he had always found it "a battle" to withstand the stresses and strains of everyday life, but it was of interest that he had appeared to triumph in this battle since he had won no small degree of success in the engineering and manufacturing worlds. The onset of his complaint is best described in more or less his own words. In January, 1933, his "left foot began to fall a bit," and shortly afterwards, when climbing over a gate, the same leg "let me down" so that he fell. At this time there was some 10 lb. loss of weight. On the advice of a consultant, he was treated with arsenic and strychnine and electrical treatment with beneficial effect, and the summer of 1933 saw a marked remission of symptoms so that the patient became able to walk a distance of seven miles. In October, he sustained an attack of influenza, after which "the tension in my muscles has relaxed a little, the tremor has been less, but the weakness greater." In a résumé of his history he said "the trouble seems to have started in the foot and gone upwards into the buttocks; the arms are affected by loss of power; the left side, both arm and leg, is decidedly worse than the right, but there has been no difficulty with bowel or bladder."

This story, though it was only a catalogue of subjective data from one who was known to have "read up" his complaint, and, more important still, by the affectless manner of its telling, was profoundly suggestive. This impression was to the effect that one was dealing with organic disease of the central nervous system. Upon the more physical side, the signs which seemed to support this view were these : Minor changes of the sexual reflexes relating to diminished potency and also diminished control; an occasional slight tendency towards associated movements of the left hand on vigorous attempts at walking; the description by the patient of "spasms of the legs" which were liable to occur if his foot struck the hot water-bottle in bed. On one occasion, when asked suddenly to walk, the patient appeared to overbalance and would have fallen heavily had his fall not been intercepted.

On the more psychological side, the findings, though numerous, bore little or no relation to the complaints. There was a lack of worsening in relation to those very situations in which neurotic symptoms would have fulfilled their function by providing a means of escape. The condition present represented far too crude a form of conversion hysteria to be the complaint of a man of this patient's degree of intelligence. Even failing the truth of this assumption, the case lacked the dramatic and anomalous features which characterize the manifestations of *grande hystérie,* to say nothing of the obvious but unconscious clinging to the complaint, the resigned martyrdom, or the more subtle pseudo-co-operativeness associated therewith. He showed altogether too much genuine anxiety (unconscious as well as conscious) to get well, and too much fear of not doing so. As a result of intelligent self-analysis the patient had reached a fair degree of insight and understanding concerning the make-up of his personality and its shortcomings—indeed, it had been solely by virtue of this that he had progressed in life to the extent mentioned; thus there were few situations in which he would be likely to ignore and repress deeper feelings in such a manner as to produce gross neurotic symptoms. In view of these findings, the opinion was expressed that definite neurological evidence would present itself within the next few months. The case was again investigated neurologically about December 12, 1933. The result was again negative. On February 1, 1934, however, the neurologist reported the appearance of a transient extensor plantar response on the left side. The ultimate diagnosis was that of amyotrophic lateral sclerosis.

FINDINGS IN 1,000 CASES

There follow two tables which set forth the result of investigating 1,000 cases by psychological means. For purposes of comparison, there have been taken in series—500 cases from hospital, and 500 cases from private practice. In Table 1 has been placed the number of cases out of 500 which, though referred as functional, were found, as a result of psychological investigation in the first instance, to be organic, while below that there has been placed the number of cases which were not only referred as functional, but which were accepted by the psychiatrist for treatment as such, only to prove organic at a subsequent date. It will be seen that the figures for hospital cases are approximately double those for private cases. For this it is believed that the sole explanation is the far more difficult nature of the diagnostic problem which may confront the general hospital. In the second table there appears, in order of their frequency, a list of the organic complaints from which the patients were suffering.

TABLE 1

	Hospital Cases	Private Cases	Total Cases
Number of cases - - -	500	500	1,000
Referred as Functional—Found to be Organic - -	44	23	67
Accepted as Functional—Found to be Organic - -	2	1	3
Remaining - - - - -	454	476	930

Concerning Table 2, a few comments and explanatory notes are perhaps called for. The prominent position of chronic epidemic encephalitis will occasion no surprise. The slight degree of Parkinsonism and extra-pyramidal rigidity, the mere lessening of associated or spontaneous movements, the subtle influence upon mental development, the anomalies of behaviour, may fail to be recognized. Toxæmic and chronic infective states of obscure origin are frequently so misleading in their manifestations as to suggest a cause other than physical, and so to be referred to the medical psychologist. The term cerebral degeneration includes a number of early dementias of organic, though of no specific, origin, of which senile and arteriopathic dementias and Alzheimer's disease are examples. Cases of amentia have been included because although they fall rightly within the province of the psychiatrist, they frequently give rise to difficulty in diagnosis, and an unexplained lack of response to treatment or operation, until the true nature of the case is revealed as a result of special methods of investigation. Cases of chorea may elude detection clinically owing to early prominence of behaviour disturbance

TABLE 2

ACTUAL DIAGNOSIS IN THE 67 CASES, OUT OF 1,000 REFERRED AS FUNCTIONAL, WHICH WERE FOUND TO BE ORGANIC

Chronic epidemic encephalitis	11
Toxæmia and chronic infective states	10
Cerebral degenerations	9
Amentia	6
Tabo-paresis	4
Chorea	4
Migraine	4
Dementia paralytica	2
Paralysis agitans	2
Epileptoid conditions	2
Visceroptosis	2
Amyotrophic lateral sclerosis	1
Multiple sclerosis	1
Spinal tumour	1
Neuritis (trigeminal nerve)	1
Deafness (middle-ear disease)	1
Chronic intestinal obstruction	1
Endocrine disturbance	1
Dystonia musculorum deformans	1
Spasmodic torticollis	1
Other cases (diagnosis not communicated)	2
Total	67

and lack of emotional control. Migraine has been included because though a psychological element may be present, the constitutional factor is felt to be the primary one, and medical treatment the more urgent consideration. In epilepsy it is the anomalous forms and " equivalents " which give rise to confusion. It is usual for cases of early disseminated sclerosis to figure more prominently in such a list as the above, since emotional facility may be the first sign of this disorder; in this particular 1,000 cases, however, one case only presented itself. The case of deafness was of interest, the patient being referred on grounds of supposed hallucinations because she complained of hearing " a beating noise " localized to her abdomen; this was found to occur 70 times a minute, however, and proved to be the patient's own heart-beat, of which she was relatively over-aware. Rare forms of dystonia are sometimes mistaken for behaviour disturbance or habitual movements. Cases of true spasmodic torticollis are not infrequently referred on the ground that the trouble is aggravated by emotional factors. In practice, however, they do not prove to be of psychogenic origin, nor do they ever yield wholly to psychological treatment. The cases of amyotrophic lateral sclerosis and chronic intestinal obstruction have been described in detail.

In conclusion I would like to express my indebtedness to Dr. W. E. Cooke for permission to refer to one of his patients.

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GENERAL PRACTICE

NO. II. CHOOSING A PRACTICE

By I. G. BRIGGS, M.R.C.S.

Barrister-at-Law.

THE newly-registered medico, rich with parchment diplomas, and primed with technical knowledge that his successful rivals-to-be have long since forgotten, has now to earn his living. He has to " sell " his knowledge and personality to the public in competition with his professional brethren. They have been trained by years of experience in general practice : he has been trained for the most part in academic medicine, from which any suggestion of general practice has probably been excluded as being vulgar. He is thus not even fitted to compete with them, and the competition is severe.

Before choosing a practice, then, the fledgling will learn his profession, and learn a little of general practice. The first he will do by taking resident hospital appointments, especially as house surgeon, and jobs in the special departments; the second by six months' assistantship to a busy general practitioner, plus several short locums. In this way he will learn the thousand and one details of actual practice, for example, that in medicine for children, incompatibility is not so important in the surgery as it is in the examination hall, whereas palatability is vastly important. He will make the inevitable mistakes on someone else's patients, will see various types of practice and various methods of medical book-keeping, and have a composite background against which to compare practices offered to him.

The newcomer may buy a practice, enter into partnership with an established man or " firm," or choose a site and " squat." Much depends on the type of practice desired. A good-class practice cannot be obtained by squatting. It can be bought, but in high-class practice more depends on the personality and social status of the doctor than in industrial practice. The vendor knows the district and the people intimately, he is received as a friend and a social equal, and a purchaser may fail through no fault of his own. Bronchopneumonia commonly pays little attention to the academic excellencies of the medical attendant, whose function, as Voltaire nearly said, is to amuse the patient while Nature kills him. If the doctor's personality is acceptable, he will be called to assist at the decease of the next member of the family; his alleged knowledge of medicine is of little moment.

BUYING A PRACTICE

A man wishing to enter good-class practice should enter partnership with a medical man having such a practice. A preliminary assistantship is usually required, but this has disadvantages as well as advantages. In six months the assistant has time to discover the faults of the owner, is inclined to criticize his "out-of-date" methods and to be irritated by his idiosyncrasies. In two years, the junior would discover also his own demerits, find unexpected merits in the senior, and find that methods that lead to instant failure in the final examination lead to instant success with patients. Partnership, like marriage, calls for much mutual forbearance, and, when satisfied that the "dowry" is as represented, it is probably wiser to plunge into partnership as into matrimony with precipitation, determined to "rub along" and "live happily ever after." One man is about as good, or as bad, as another, and life will pass in successive six-monthly trials ere the ideal is found. The young practitioner buys his share of a practice; it is his business to work harmoniously with the man. A

" firm " of four or five is better in many ways than a two-man partnership, but such firms usually require partners of experience, with specialized knowledge of some branch.

Prices of practices vary from one year on a death vacancy, 1½ years for a country practice, 1½–2 years for town practices, 2–2½ years for partnerships, based on average gross returns for the preceding three years. Prices, particularly in London, are hardening, for bona-fide practices are hard to find. Most men have limited capital, but it is wiser to borrow more to purchase a bona-fide practice (if it can be found) than to be too cautious or too grasping, only to find too late that the reality is not there. Sternly resist the temptation to look for a " bargain " ; to obtain a first-class practice at a third-rate price is a miracle, not a bargain. It is wiser to pay £2,500 for a genuine £1,000-a-year than to pay £1,500 for an alleged £1,000-a-year which, in fact, returns £500-a-year. " If a man offers you something for nothing, fetch a policeman." To the reader this advice will seem trite. If every qualified man knew it by heart as he knows the brachial plexus by heart, about half-a-million pounds a year would be kept out of the pockets of rogues.

If it is decided to buy a practice, the young practitioner should ask the medical agents for details of practices on their books, and also insert a small advertisement in the medical journals. Agents simply pass on information; they do *not* guarantee its accuracy. Reputable agents can often form an amazingly accurate estimate of a practice. What they say, and what everyone says, must be carefully considered, followed by the usual thorough investigation, when a personal judgment can be formed. Probably 60 per cent. of the information is false; if the investigation is thorough, half the inaccuracies will be discovered. The young purchaser will consider this advice needlessly cynical; when he has purchased two or three practices he will consider it insufficiently frank.

ESSENTIAL DETAILS

He should get, then, the fullest possible details—gross receipts and net profits for several years, certified by an accountant's certificate; sum of outstanding accounts and percentage of same to total takings; number on panel or clubs; scale of fees; amount of midwifery, prescribing or dispensing; time established; appointments and if transferable; price or rent of house, length of lease unexpired, if transferable and renewable, and price asked. He must make sure that the vendor does not earn a large proportion of his income by a speciality which the purchaser is incompetent to practice. The purchaser should also inquire if the vendor is on the staff of a local hospital, and if he can succeed him.

He should see that the vendor writes and signs all his statements. "Let the buyer (not the seller) beware" says the Law, which seldom relieves a careless man from the consequences of his folly, and takes little account of what a man *says*, but much of what he signs and (preferably) seals. In business negotiations the simple "medico" will find everyone willing to give lordly assurances that all he desires exists or will be done. Without exception he should have these assurances *written and signed*, or proceed no farther. He must inspect and check all documents. It is useless later to complain that it was "gathered," that such and such was intended or represented. If a purchaser contracts *verbally* he will "gather" wisdom, but little else.

The prospective purchaser should get permission to make inquiries, and *be discreet*. It is not always expedient to say that he proposes to buy Dr. X's practice. A hint that he thinks of settling in the district, plus tactful guidance of the conversation, will often produce the details needed about Dr. X and his practice (if any), and valuable information about competitors-to-be. The Local Secretary of the B.M.A., local chemists, and dental surgeons should be seen and the local M.O.H., and the Council Surveyor should be consulted also about local conditions and impending development.

The young doctor should let his wife or fiancée inspect the house, but he should not decline an excellent practice because the house is not the house of his dreams. Unsatisfactory houses can be made satisfactory by doctors earning a large income; excellent houses cannot be maintained by those who have bought moribund practices. Feminine "intuition" must be distrusted, whether in playing bridge or in buying a practice!

When satisfied that the practice is what is required, the books should be checked by an accountant specializing in medical work; the B.M.A. or the defence unions will furnish names. This will cost several guineas, and if no purchase results is money lost. It is better to lose four guineas than two thousand guineas. If the vendor declines an accountant's investigation, or stresses his "honour," or keeps "sketchy books," or incorrect books "for Income Tax purposes, don't you know," he should be bidden a courteous adieu.

Medical book-keeping is deplorably bad, and all an accountant can assert is that the books *as kept* show certain results. His certificate is *not* a guarantee; his report is but one of many facts to be weighed in forming a personal judgment; this is why it is so necessary to make careful and exhaustive local inquiries.

The awkward questions which usually arise later may not have occurred to the vendor any more than to the purchaser at the time of sale. He may be as honest as the prospective incomer, and yet grave disagreement may arise. He may be dishonest: the temptation to sell either a good thing or a bad thing at a high price is common to all. "Ill health" is a euphemism which covers alcoholism among many other things. The vendor's character may be bad, his reputation poor, his practice moribund. Names in a book do not prove that patients still exist, or still reside in the vicinity, or attend the surgery. It is "live" patients who are needed, in a double sense, and the purchaser will be lucky if he retains 80 per cent. of them. To "chance" things in business dealing is to invite trouble, and he is singularly fortunate who does not get it, swiftly and in embarrassing amount.

The alleged reasons for selling do not concern the purchaser unless they adversely affect his chances of success; such reasons will *not* be disclosed, if inquiries are exhaustive they will be unearthed. It is necessary to find out not *why*, but precisely *what* the vendor is selling, as often as not it is a "pup."

The purchaser should not pay a hazily-arrived-at "lump sum." He should agree on a definite premium, plus what drugs, furniture and equipment he selects, at the second-hand market price determined by a medical valuer. This will cost more guineas, and be very annoying, but it will save more than it costs.

Next, the B.M.A. or a Defence Society should be asked for an introduction to one of the few firms of solicitors specializing in medical work. Medical transfers raise many highly technical points which never occur to a doctor, and with which the ordinary solicitor is not familiar. When negotiations have crystallized, let the vendor put his offer into writing, and sign it, as it is essential to know exactly what he offers. The purchaser should *not* write and sign anything, for his solicitor now acts for him.

These preliminaries are unbearably tedious, and expensive, but the young doctor is probably staking his all, and such preliminaries may mean the difference between years of comfort, or years of acute distress. The temptation to dispense with the expensive and usually dilatory services of a lawyer, and to act alone, or trust the word of the vendor as a gentleman, is as strong as the temptation to amateur physic on the part of laymen. Amateur physic is an amusing and harmless pastime; amateur law is often illegal, and always deadly. Millions would be saved by going to Law at first, instead of at last.

Panel and club patients are fairly solidly transferable. Not more than 7½ per cent. should be lost. The transfer of private patients is problematical. Much though it is to be deplored, medicine is rapidly becoming a *trade.* " Medical etiquette " exists chiefly in the lay press, and patients try a new doctor as freely as a new butcher or baker. Patent medicine advertisements are partly to blame, for they assure patients that their ills *can* instantly be cured. Consequently, if the patient comes to Dr. X at all, he is likely to try Drs. Y and Z if Dr. X fails to produce the cure within fourteen days. Many patients change to another man they know, rather than to a stranger; the majority call in the purchaser once, and their adhesion will depend on his personality, rather than on his knowledge of detailed anatomy. Some will drop off, some new ones will come, usually the folk who drift from doctor to doctor, abusing each in turn to his successor, exhausting all and paying none. It is difficult adequately to succeed a capable, respected man (which the vendor necessarily is if he has a sound practice to sell), and the newcomer must be prepared to see the first year's takings substantially below the average he has paid upon; he must build up again by keen effort. A long introduction is a grievous trial to both parties, and is bad psychology. Make the introductory period as short as suffices to obtain a grasp of the district and type of practice, and to meet the more important patients.

The price of a death vacancy should not be more more than one year unless there is a heavy panel; it should be less if the vendor has been dead more than one month. It must be assured that there is a locum to introduce the purchaser, and the bond that prevents him competing should be inspected.

A " nucleus " should usually be avoided. The vendor selected the site because he expected to make a living there. His reasons for sale may be as true as they are specious and varied, but it would seem he has not made a substantial income in the (say) year or two he has been there. Given a like period, is the newcomer likely to make the substantial income? If he thinks so, he should buy, remembering that, while

" Hope springs eternal in the human breast "

the next line, which so few recall, is equally true:

" Man never is, but always to be blest ! "

THE SQUATTER

It is now proposed to discuss the " squatter," a term of affection applied by his confreres to the man who selects a site for himself and exhibits his plate. His welcome resembles that usually accorded to a rattlesnake. The statement of the problem of " Where to squat? " is engagingly simple. It is the solution which will exhaust and probably ruin anyone attempting it. There is one doctor to every 1,000 people. To exist, the practitioner must find 1,000 people who need a doctor; to live comfortably he must find 3,000 such people. As there are, on an average, four people to a house, he needs to find at least 250 houses without a doctor nearby, preferably up to one thousand such houses.

The young doctor can only hope to squat successfully in an industrial district, and although the job is expensive and incredibly tedious, the " anatomy " of each suggested district must be thoroughly mastered ere Fortune is tempted there. A growing suburb is the safest but, unfortunately, new building is falling off as rapidly as the Medical Register is growing, and a speculative builder who ten years ago would have built and sold a thousand houses in two years is now more likely to build and sell two hundred. It is a good plan to write to all the builders who advertise in the press, asking for details of their estates, and if there is an " opening " for a doctor. Most will reply there is an excellent opening, undistressed by the probability of a speedy closing. The next step is to visit them in order, prepared to spend two or three days in the district. It is best to call first on the local Council Surveyor, see the local Town Planning map, and get a copy of that, or of some good local map. A map is essential. I once visited a small new estate which seemed admirable, and found a main road with trams but no doctors; just before I committed myself, I found *the* main road littered with doctors. An unknown district is very confusing, but with a map a quick grasp of the locality can be obtained.

It is necessary to find out what builders are developing, what plans and schedules they have deposited, in what directions the district is growing, and to note factory, shop and residential zones. The surveyor should be induced to give all the information he can, and he should be asked (and also the M.O.H. and sanitary inspector who should be seen next) to mark all doctor's houses they know with a clear black dot, and if they think this district unsuitable, whether they can suggest a likely one. A note should be made of all the information as it is obtained; the outlook may not seem rosy, but it may prove rosier than any other spot inspected, and full details are necessary for comparison.

The builder should next be seen to find how many houses he has built, and how many he will covenant *in writing* to build within the next two years, which will be a mere fraction of the number he optimistically " thinks " he will erect. He should be asked if he will agree, *in writing,* not to sell a house to any other doctor. The Courts would probably not restrain another doctor, but damages could be obtained from the builder.

A long view must be taken, and the " squatter " must be first in the field. I was once literally " in the field " with not a house in sight, and had a 2,500 panel in two years. Then newcomers are secured as they enter, and prospective competitors are " warned off." It is wise to try to set up slightly in advance of the development " tide," the flow of which should be ascertained, if possible, from both County and Local Council Surveyors. It should be remembered that suburban areas develop with railways and tubes, and prompt use should be made of any Press hint of rail extensions. If the builder covenants to build 500 houses, and the " squatter " is there when five are built, he will gradually get the other 495; if he waits for 300 to be built, he will find three doctors there.

If possible it is important to get on the main road, and a study should be made of the " tidal flow " of inhabitants, which is toward the station and shops. A shop as surgery should be avoided, and over a shop is unsatisfactory, but *near* a chemist's shop is very sound. A " lock-up " surgery should be avoided as caretaker and telephone to the house add to the expense, and patients with pricked fingers will not wait for the caretaker to unearth the doctor, lest meantime they bleed to death.

The " squatter " should call on any chemists and dentists, and also on the nearest doctors. The latter will not welcome competitors, and this must be remembered in weighing their advice. But they know the district better than an outsider, they will often tell him how they have succeeded (or failed), and may even offer to sell their practices, an offer that may cause the hearer to sense that " note of dubiety " that a patient of mine once thought he detected in my wife's voice when she told him, at 2 a.m., that I was " out."

An attempt should be made to find out if the Council have housing schemes under way, and if they will sell or lease a site on an estate with a " monopoly." Most councils will not permit doctors to rent council houses, nor will they grant a site, but the London County Council do so, granting a monopoly of 1,000 houses per doctor. The intending practitioner should write to the Valuer of the London County Council, Spring Gardens, London, S.W.1, and ask to have his name placed on the waiting list. The list is very long, but many have settled elsewhere when their turn arrives. If in due course a monopoly is secured a large practice is absolutely assured.

CONCLUSIONS

A location should then be chosen with the utmost care, and the young doctor should not despair if month after month goes by, and district after district proves unsuitable. The search will prove long, costly and tiring, but if conducted wisely will in all probability lead finally to success. If a choice is made hastily, or a bad spot is selected in despair of ever finding a better, failure will ensue, and if so, what guarantee is there that a wise choice will be made on a subsequent occasion, if, indeed, capital permits another attempt?

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PRACTICAL NOTES

DIAGNOSIS OF UNEXPLAINED HIGH FEVER

L. Hamman and C. W. Wainwright (*Bulletin of the Johns Hopkins Hospital*, April, 1936, lviii. 307) follow up their analysis of cases of continued fever of a low grade, rarely above 101° F. (*vide The Practitioner*, May, 1936, lviii, 659) by consideration of 54 cases of obscure high fever. In ten of these a satisfactory explanation of the cause was not obtained; in the remaining forty-four cases a surprisingly large percentage (23) was accounted for by syphilis. The dramatic effect of iodide in these cases of syphilitic fever is illustrated by a case in which the temperature had risen above 108° F., but became normal ten days after iodide medication began. That fever in a patient with a positive Wassermann reaction is due to syphilis can only be settled by the therapeutic test, the administration of iodides. Tuberculosis comes next and close to syphilis as responsible for high fever of obscure nature. Septicæmia and subacute bacterial endocarditis are now so successfully detected by blood cultures that they do not provide many cases of obscure origin. Malignant disease provided eight out of the forty-four cases, five being examples of renal growths. Undulant fever explained four cases, and it is pointed out that the Pel-Ebstein (relapsing) fever of lymphadenoma may imitate it. Tularæmia, which may imitate tuberculosis even at the necropsy, accounted for one case.

CALCIUM IN THE TREATMENT OF EPIDIDYMITIS

For a number of years various salts of calcium have been employed in addition to the usual measures in the treatment of acute epididymitis and other complications of gonorrhœa. A. E. W. McLachlan (*British Journal of Venereal Diseases*, April, 1936, xii, 109) has recorded his experiences with this form of therapy. Various salts were employed: calcium chloride, 5 to 10 c.cm. of a 10 per cent. solution; calcium gluconate, 5 to 10 c.cm. of 10 per cent. solution; calcium lævulinate, 10 to 20 c.cm. of 10 per cent. solution; calcium thiosulphate, 6 to 10 c.cm. of 10 per cent. solution. The chloride and thiosulphate can only be administered intravenously: the gluconate and lævulinate cause no untoward reaction on intramuscular or deep subcutaneous injection. All calcium salts should be injected with extreme slowness, to obviate or minimize as far as possible the transient feeling of intense heat in the skin which comes on during or immediately after intravenous injection. When possible, calcium was administered daily for three or four days, then on alternate days or twice weekly over a period of seven to fourteen days. It seems clear that both in epididymitis and in salpingitis the use of calcium curtailed the period of disability, relieved pain, and lessened the permanent tissue damage. Calcium salts must be given as early as possible after the onset of the complication and the routine measures such as rest, support of and hot and cold applications to the affected parts, alkaline diuretics and other well-tried procedures must not be neglected. Calcium appears to be of little value in shortening the normal course of gonococcal infection or in preventing complications.

CONGO RED FOR THE CONTROL OF BLEEDING

Within recent years many authors have reported satisfactory experiences with congo red in the control of bleeding, especially for hæmoptysis. R. C. Graves and C. J. E. Kickham (*The New England Journal of Medicine*, April 16, 1936, ccxiv, 782) report the use of this dye for other types of hæmorrhage and in particular for the control of hæmaturia. It has been used by them for such cases as renal injury, renal and ureteral calculi, chronic pyelonephritis, vesical calculi, benign hypertrophy of the prostate and bladder tumours. The dye has also been used as a prophylactic agent following prostatectomy and in such acute conditions as severe epistaxis and hæmorrhage after tooth extraction. Five to 10 c.cm. of an isotonic solution of congo red given intravenously constitutes the usual dose and this may be repeated if necessary. There are no untoward effects and even if the dye spreads outside the vein there is no reaction in surrounding tissues.

A. Agranat (*South African Medical Journal*, May 9, 1936, x, 332) also refers to the value of congo red as a hæmostatic. He uses a one per cent. solution in re-distilled water and urges great care during the injection which must be given slowly taking about ten minutes for 10 c.cm. In four cases of hæmatemesis and in one case of secondary post-operative hæmorrhage after hysterectomy, good results were obtained.

THE DIAGNOSIS OF RUBEOLA

V. Debenedetti has studied an epidemic of rubeola which occurred among 52 soldiers at Ivrea during April, 1935 (*Minerva Medica*, June 9, 1936, xxvii, 537). In all the cases there was considerable swelling of the lymphatic glands while the blood picture showed a marked resemblance to that of infective lymphomonocytosis. This striking resemblance of the blood picture between rubeola and lymphomonocytosis suggested an investigation as to whether there existed in rubeola any heterophile agglutination similar to that in lymphomonocytosis. It was noticed that Paul and Bunnel found out by chance that the blood of the latter had a strong agglutinating power over the blood cells of the sheep and this reaction has been confirmed by Bier, Penati and others as has been regarded as specific in cases of this disease since in no other was it positive. The author used the original technique in estimating the occurrence of the Paul and Bunnel reaction. In five cases it was done on the 5th day and in one on the 3rd, 7th, 10th and 14th days. In all these cases the result was entirely negative even up to the limit of dilution 1 in 64. It is therefore certain that this reaction furnishes an element of differentiation between rubeola and infective lymphomonocytosis which may prove valuable to those cases of the former which run their course without any eruption.

SEDATIVES IN THE TREATMENT OF TETANUS

Summarizing his experiences in the treatment of tetanus, E. T Freeman (*The Irish Journal of Medical Science*, April, 1936, 166) stresses the value of luminal and of avertin in the control of the disease. Serum was given freely, but only by the intravenous and intramuscular routes as the intrathecal route was not considered advisable. Luminal was employed in all cases with excellent results, and it is claimed that its effect is like that of chloral but with an action much more prolonged and moreover it can be injected so that there is no difficulty in administration. Avertin was employed almost constantly for thirteen days in one patient, the dose being midway between the total anæsthesia dose and the obstetric dose for the patient's weight, the drug being administered per rectum night and morning. Feeding was carried out by means of glucose solutions by the mouth, by the rectum or intravenously and it is claimed that all patients, however severe the trismus, should have a pint of glucose solution daily by one of these routes.

BILE SALTS AND STREPTOCOCCAL INFECTIONS

The attack upon the problem of streptococcal infections by means of chemical agents continues and R. Hilgermann (*Deutsche medizinische Wochenschrift*, May 29, 1936, lxii, 883) now suggests the use of bile salts as a means of stimulating the active immunity of the body. Sodium taurocholate appears to be the preparation which has answered most satisfactorily in experimental tests both from the point of view of treatment and prophylaxis. G. Shäfer (*ibid.*, 884) has carried out clinical tests with this and other chemicals provided by Hilgermann and he summarizes his findings, particularly in puerperal infections, during the last eighteen months, stating that during 1935 in his clinic in Berlin there has been no death from sepsis or pyæmia in the puerperium. Unfortunately exact details of treatment are not given except in the statement that doses of 5 c.cm. have been injected daily, usually by the intramuscular route with one free day every fourth day. Injections of bile salts have also been used in a prophylactic manner in cases of criminal abortion admitted to hospital before obvious signs of severe infection have shown themselves.

STRYCHNINE IN SEVERE DIPHTHERIA

The use of strychnine as an ancillary method of treatment for severer types of diphtheria is the subject of a special comment in *Le Progrès médical* (May 30, 1936, 922). It is suggested that all severe forms of faucial diphtheria should be treated by an extensive course of strychnine but this should never be used when there is any laryngeal involvement. The dosage should be proportional to the severity of the illness and the weight of the patient (usually a child). The suggested daily dosage per pound body weight is as follows :—

" Hypertoxic " type	1/100–1/64 grain
" Malignant " type	1/160–1/128 grain
" Grave " type	1/256–1/224 grain

[These doses are the rough equivalents of the metric system dosage.]

The total daily dose is divided up in the course of the day and usually an injection is given every two or three hours. In the young infant, not more than 1/64 grain should be given per injection and for the older children not more than 1/16 grain per injection. The strychnine treatment should be continued for a fortnight from the beginning of the sore throat and the dosage not decreased unless there is obvious evidence of great improvement in the local throat condition. Serum treatment and other measures are employed according to the usual rules. It is claimed that this treatment has considerably reduced the mortality in those institutions where it has been used.

INJECTION TREATMENT OF HERNIA

Although introduced nearly one hundred years ago, the method of treating hernia by injecting irritants into the sac has never become very popular in this country. W. M. McMillan and D. R. Cunningham (*The Journal of the American Medical Association*, May 23, 1936, cvi, 1791), following a careful experimental study of the subject, have proceeded to apply this method of treatment in selected cases with satisfactory results. Very careful selection is essential and hernias associated with undescended testicle and irreducible hernias were ruled out. No attempt was made to treat patients suffering from the following conditions involving the general health : marked obesity, hæmophilia, syphilis, neurosis, toxic goitre. Patients suffering from chronic cough, or requiring surgery for associated conditions, such as tumours or hydrocele, were also ruled out and it was a rule that no patients would be treated unless all symptoms had been previously relieved by wearing a truss. The wearing of a truss is an essential preliminary stage in this treatment, being used day and night for one to two weeks before and for a varying period after treatment. The solutions used in injection were either one containing tannic acid, benzyl alcohol, and grain alcohol (with which a preliminary injection of a local anæsthetic is used) and a solution containing phenol, alcohol and tincture of thuja. The technique of injection requires a careful attention to detail and apparent clinical cure may result from as few as four injections, although on an average 8 to 13 are required given once or twice a week depending on the reaction.

SUPPOSITORIES OF MERCURY FOR ŒDEMA

The value of organic mercurial salts for the treatment of chronic or recurrent œdema is well established, but the disadvantages of injection, necessitating frequent visits to the doctor or in-patient treatment and the risks of irritation round the site of injection have all combined to prevent full advantage being made of this way of producing diuresis. M. N. Foulton (*The New England Journal of Medicine*, May 28, 1936, ccxiv, 1092) has recorded his experiences with " mercurin " in suppository form. Most of his patients, suffering from œdema of cardiac origin and after a few days observation to allow for adequate dosage of digitalis or a spontaneous diuresis were given a gram of ammonium chloride, three or four times a day. Two to four days later a suppository made of cocoa butter base containing 500 mgm. of the mercurial salt of mercurpurin is inserted first thing in the morning following a cleansing enema. This is repeated at intervals of four to six days, the patients meanwhile continuing on a daily dosage of three or four grams of ammonium chloride. The diuretic response is reported to be very satisfactory, beginning one to three hours after the suppository was given. There was very little local irritation and the simplicity of the method described is a great point in its favour.

HÆMOLYTIC SERUM FOR DISSEMINATED SCLEROSIS

Among the methods of treatment advocated for disseminated sclerosis, attempts to find something along the lines of immunotherapy have been tried in recent years. The use of rabbit serum obtained from animals previously injected with blood and cerebrospinal fluid obtained from patients suffering from the disease has been tried in certain countries during the last few years. F. Borbély (*Wiener klinische Wochenschrift*, June 12, 1936, xlix, 743) now recounts his experiences with this method of treatment. Quite a small dose, one to four c.cm. of the animal serum have been injected subcutaneously and the result of the injection has always been more or less severe grades of fever, jaundice, anæmia and hæmoglobinuria —all attributed to some hæmolysis produced by the effect of the rabbit serum on the human blood. After the reaction, great improvement is recorded in many cases. That this is not merely the effect of non-specific " protein shock " or some similar mechanism is proved by the fact that, although the same general reaction can be produced by the use of rabbit serum obtained from animals which have received injections of normal human blood, there was no improvement in patients suffering from disseminated sclerosis treated in this way.

DIFFERENTIAL DIAGNOSIS OF UNDULANT FEVER AND ABORTUS INFECTION

A. Basserga has endeavoured to establish a differential clinical diagnosis between the various forms of Brucellosis especially between the forms of fever due to *Brucella abortus* and *Brucella melitensis* (*Rivista Sanitaria Siciliana*, April, 1936, xxiv, 357). Having occasion to study in Catania more than 140 cases of the latter affection he found that in melitensis infection the course was on the whole more serious and the general condition of the patient more affected, whereas in abortus fever they were both much slighter. The type of fever in melitensis infection was markedly undulant, whereas in abortus infection it was often intermittent and irregular. The pulse was raised in 42 per cent. of the cases of melitensis whereas in abortus there was relative bradycardia. Articular changes often conspicuous were noticed in 21 of the cases of melitensis, but were rare in abortus fever. Anæmia was noticed in 13 per cent., while it was rare in abortus, but endocarditis rarely occurred in either and could not be regarded as a normal component of the clinical picture. Constipation was very frequent in melitensis, 63 per cent., while diarrhœa was more noticeable in abortus. The degree of the splenic enlargement was moderate while in abortus it was almost always present and frequently considerable. Orchitis occurred in 5–20 per cent. of the cases, while in abortus it was only met with in 2–4 per cent. He is convinced that a fuller and more minute study of the two conditions will show differences but not in every case.

REVIEWS OF BOOKS

The British Encyclopædia of Medical Practice. Volume 1. Under the general editorship of Sir HUMPHRY ROLLESTON, Bart., G.C.V.O., K.C.B., M.D., D.Sc., D.C.L., LL.D. London: Butterworth & Co. (Publishers), Ltd., 1936. Pp. xxxvi and 742 with 60 pages of index and 96 figures. Price 35s.

THIS first volume of an attempt to produce the most complete and authoritative contribution to medical literature ranges from abdominal pain to appendicitis. The editor has collected a fine team of experts and he is assisted in a consultative capacity by five specialists in different branches of medicine. The names of the contributors guarantee that the subjects dealt with have been adequately covered, but even more important in a work of this type are the methods adopted for reference purposes. The general scheme is alphabetical with a special system of cross references and a synopsis at the beginning of each section. An index is provided to each volume as a temporary measure: eventually an exhaustive analytical index to the whole work will be issued as a last volume. Finally by means of a unique " supplementary " device employing a key number on each right hand page and the issue of a new supplementary volume from time to time it is planned to keep this encyclopædia up to date. The printing is clear, the illustrations are well chosen and the whole production and binding are of a high standard. The issue of this large work is naturally a somewhat hazardous experiment and the publishers can be assured that they appear to have done everything possible to reduce their risks and to guarantee a good sale. Practitioners should find this ready-reference work of great value.

Practical Points in Anæsthesia. By H. K. ASHWORTH, M.B., CH.B., D.A. London: J. & A. Churchill, 1936. Pp. viii and 160. Figs. 16. Price 7s. 6d.

DR. ASHWORTH'S small volume is addressed to the infrequent or inexperienced anæsthetist, but its perusal suggests that it has been written for the latter rather than the former. With certain exceptions, the whole field of anæsthesia is surveyed in a clear, dogmatic and, perhaps, elementary manner. The various sections are concise and they are well classified. Reference is not made to the more advanced anæsthetic procedures such as carbon-dioxide absorption technique or the administration of vinethene or cyclopropane but an account of the use of Clover's inhaler, which is so valuable to the general practitioner, and an allusion to endotracheal anæsthesia might advantageously have been included. Although the production of basal narcosis by recently developed agents is discussed in detail, the use of paraldehyde for this purpose is not described. But, as the title implies, the book is full of sound and practical advice for the inexperienced anæsthetist and this constitutes its main feature. Such points as the administration of ephedrine at least twenty minutes before a spinal anæsthetic, the correct method of eliciting the eye signs, and the fact that a change in the degree of surgical stimulation received by the patient alters the depth of anæsthesia, although learned by experience, are prone to be forgotten by the beginner.

Squint Training. By M. A. PUGH, M.R.C.S., L.R.C.P. Oxford University Press. London: Humphrey Milford, 1936. Pp. 111. Illustrations 42. Price 7s. 6d.

THE author of this work has occupied for some years the post of Medical Officer to the Orthoptic Department at the Moorfields Eye Hospital where she has had a wealth of clinical material on which to work. Coming from one who has tried to think widely about this subject this book is especially welcome at a time when from the chaos of case reports and clinical facts it is necessary to establish some order and give some guiding principles with which to work, at any rate, for the time being. The book deals essentially with the practical aspects of squint training. Methods of orthoptic training are described, and a chapter especially devoted to an account of this work in dealing with complicated cases of abnormal binocular projection and abnormal retinal correspondence. The appendix illustrates a number of orthoptic instruments and describes the mode of operating these. The book is well produced and the illustrations good.

A Handbook of Urology. By VERNON PENNELL, M.A., M.B., F.R.C.S. Cambridge University Press, 1936. Pp. 224. Illustrations 34. Price 7s. 6d.

THIS attractively-produced book, designed mainly for the use of students and practitioners, amply fulfils its purpose of giving them in short compass a well-balanced and readable synopsis of modern urology. Besides the usual contents, there are valuable chapters on the investigation, and also on the nursing and management, of urological patients, and brief descriptions are given of anæsthetic methods, renal function tests, and operations on kidneys, bladder, and prostate, with fair appreciations of their respective merits. There is also a useful chapter on the diagnostic significance and investigation of some common symptoms. Certain errors must be noted. In the urea concentration test 15 gm. of urea are administered, not 25 (p. 14). In describing ascending pyelography the author says: "The X-ray photograph must be taken on the cystoscopic or operation table." This is not so, the patient in many clinics being transported after ureteric catheterization to the X-ray room, with little if any disadvantage. Preliminary aspiration of the contents of the renal pelvis is recommended not merely, as the author suggests, to avoid dilution of the opaque medium, but mainly to avoid over-distension. All will not agree that the injection of the opaque medium is given preferably by an assistant; that the gravity method is safer for a beginner than injection with a syringe; or that it is safe to wait for return-flow outside the ureteric catheter as a sign that the pelvis is full. A thin-walled hydronephrosis may be, and has been, thus ruptured. In the description of intravenous pyelography the absence of all mention of uroselectan is surprising. Despite these errors and unorthodox opinions this can be regarded as a valuable and handy work, crammed with up-to-date urological information.

By-effects in Salvarsan Therapy and their prevention. By V. GENNER. Copenhagen: Levin & Munksgaard, 1936. Pp. 360 with 16 tables. Price 22 Danish Kroner (approximately £1 1s.).

THE material for this book was collected by the author in the University Clinic of Dermato-Venerology, Copenhagen, and contains notes upon 146 cases of salvarsan erythema and 125 of jaundice. By intracutaneous and epicutaneous tests with "914" the author obtained evidence of skin sensitiveness to the arsenicals even in some cases years after treatment had ceased. He recommends daily intravenous injection of 1 to 2 gm. of sodium thiosulphate until the erythema disappears. The author's views about the causation of salvarsan jaundice are rather vague. He found that in most of his cases jaundice appeared after a total dosage of 3.6 to 4.3 gm. of neosalvarsan. If anti-syphilitic treatment was stopped or restricted to bismuth in the mild cases, the author found that after the jaundice had disappeared resumption of arsenical treatment apparently led to few relapses (1 in 50). This is interesting in view of the abrupt cessation of arsenic administration which is usually enforced permanently after a very small total dosage of arsphenamine has produced jaundice, as it may, in extreme cases, result in a case of primary or secondary syphilis having to rely on bismuth alone. The English of this book obviously suffers in places from attempts at literal translation of continental constructions.

The Hygiene of the Change in Women. By I. E. HUTTON, M.D. London: Wm. Heinemann (Medical Books), Ltd., 1936. Pp. 105. Price 5*s*.

THIS excellent little book has been written in order to put before women a short résumé of the whole subject of the climacteric, and to give them directions for looking after their health so that they may continue to lead a normal and efficient life during this phase. The author has been careful to omit any details of medical treatment, but the directions for the care of the health are simple and efficacious and based upon sound physiological principles. Care is taken throughout the volume to warn the reader of symptoms which are abnormal and which should not be allowed to continue without the advice of a doctor. The subject of cancer and its symptoms is discussed rationally and readers of the book will run no risk of developing a phobia about the disease.

Change of Life in Men and Women. By MARIE C. STOPES, D.SC., PH.D. London: Putnam, 1936. Pp. xv and 282. Price 6*s*.

THIS cleverly and attractively written book is "dedicated to young people so that they may enter charted seas, and avoid the hidden rocks that wrecked their elders' joy," and is obviously intended for the lay public. It, however, contains many references to medical authorities, especially to Gregorio Marañón, professor of medicine at Madrid, who may be surprised to find himself described in one place as a famous gynæcologist and in another as professor of medical pathology. Other authors quoted are Kenneth Walker, Leonard Williams, McDonagh and Arbuthnot Lane, who are freely criticized, the use of "medical paraffin" being "earnestly and emphatically" denounced as a highly dangerous substance for internal use and one of the sources of a serious disease (not further specified) " increasingly common in our cockney civilization." A distinction is rightly drawn between the menopause and the climacteric, the latter being regarded as occurring in both sexes and due to gonadal changes. In males the climacteric, occurring about the age of fifty, is often accompanied, by temporary impotence. The occurrence of prostatic hypertrophy, ascribed to testicular hormonal inadequacy, is said to be also aggravated by wearing trousers instead of the kilt or the Roman toga, as cool air and sunshine are thus excluded from the testes, by toxic absorption from the rectum, and to be a compensatory hyperplasia analogous to goitre. For its prevention extract of the prostate is advocated, and for its cure prostatic, thyroid and testicular extracts. The climacteric symptoms in women are stated to be largely due to suggestion and exaggeration of their significance. An appendix describes the treatment of the climacteric; this includes the administration of hypophosphites, listerine " the one disinfectant which both kills germs and encourages the growth of healthy tissue," sulphur, diet, for example whitebait, because the whole fish is eaten, and electricity.

Medical History of Contraception. By NORMAN E. HIMES, PH.D. Medical Foreword by R. L. DICKINSON, M.D., F.A.C.S. Baltimore: The Williams and Wilkins Co. London: George Allen and Unwin, Ltd., 1936. Pp. xxxi and 521. Figs. 30, Tables 29. Price 25*s*.

THIS work by the professor of sociology at Colgate University, New York, is the tenth volume of the Medical Aspects of Human Fertility series issued by the National Committee of Maternal Health in New York. The present history of contraception is dedicated to Soranos (A.D. 98–138) of Ephesus, the most brilliant gynæcologist of antiquity who gave an account of contraceptive technique which remained the most complete up to the nineteenth century. Professor Himes has spent ten years over this collection of data from all possible sources and shows convincingly that contraception, which is one form only of population control, is a social practice of much greater antiquity and geographical universality than medical and social historians have realized. The amount of diligent research which has been undertaken in the carefully documented review is shown by the bibliography which occupies sixty pages and is preceded by a special section containing eleven items and entitled " bibliography of bibliography." Though many preceded Francis Place in discussing the technique of contraception, he appears to have been the first to attempt in 1822 to educate the masses, and therefore holds the same position in the social education on contraception that Malthus does in the history of the general population theory. This valuable history must long remain the standard source of reference on contraception.

Birth-Control Methods. By NORMAN HAIRE, CH.M., M.B. London: George Allen & Unwin, Ltd., 1936. Pp. 192. Plates 16 and 14 figures. Price 6s.

MR. NORMAN HAIRE has written a thoroughly practical manual on contraception including sections on abortion and sterilization. It is intended for the intelligent layman as well as primarily for the guidance of medical practitioners and students and, like so many books aimed at the wider audience, is an unsatisfactory mixture of highly technical discussions and very elementary biology. A summary of the detailed suggestions on the working of the Gräfenburg ring is not suitable for lay-readers and the doctor scarcely needs a photograph of a condom. It is scarcely the type of manual for the shy affianced couple. Nevertheless the book commends itself because it is written by a specialist with long experience of this branch of preventive medicine. Ethical considerations form no part of the scope but Mr. Aldous Huxley in a foreword uses the term " preventive ethics " by which he claims social reforms, including contraception, must be judged.

NEW EDITIONS

The Operations of Surgery. By R. P. ROWLANDS, M.S., F.R.C.S. and PHILIP TURNER, B.SC., M.S., F.R.C.S. (J. & A. Churchill, Ltd. Price 36s.) THE eighth edition of this well-known textbook of operative surgery must be welcomed. It will repay the serious student who reads it in contemplative fashion rather than in the complacent wish to pass an examination with the minimum of study. Nevertheless this book can be sincerely recommended to the candidate for higher qualifications, partly on account of the wisdom contained in its pages of which he cannot but make profitable use in his examination, and partly because of the attitude towards surgical work that this book must impart to the appreciative and sensitive reader. In general those in search of the most recent developments will not be disappointed. Here is a book of operations in which the surgical treatment of all sorts of patients is described in minute and practical detail, and it should prove a convincing reason for the study of this old-established work in its latest version. The publishers must be complimented on the printing and make-up of the book. The figures are profuse, are well drawn and reproduced, and are really illustrative of the text.

A Short Practice of Surgery, by HAMILTON BAILEY, F.R.C.S. and R. J. MCNEILL LOVE, M.S., F.R.C.S. (H. K. Lewis & Co., Ltd, 28s.), has reached a third edition a little over a year since it last appeared. This is sufficient testimony to the popularity of one of the best books for students written on this subject. The use of illustrations and of small type make it particularly suitable for examination candidates.

Vitamins, by W. R. AYKROYD, M.D. (Heinemann, 7s. 6d.), in its second edition presents the facts of the causation and manifestations of deficiency disorders in a thoroughly up-to-date manner. This is more than a popular exposition of the subject and in virtue of the author's special experience it is full of excellently presented material. The broad outlook on problems of nutrition which is present throughout is especially valuable at this time for the general student of world social affairs.

A Manual of the Common Contagious Diseases, by P. M. STIMSON, M.D. (Baillière, Tindall & Cox, 18s.), is the second edition of a useful contribution in this branch of medicine. A new chapter has been added on smallpox and there is evidence of much revision to bring the rest of the book up to date.

NOTES AND PREPARATIONS

VENEREAL DISEASES

The Minister of Health has issued circulars (Nos. 1536 and 1536a) to the responsible Port and Local Authorities in England and Wales enclosing a revised list of treatment centres in the chief sea and river Ports throughout the world at which seamen can obtain gratuitous treatment for venereal diseases in accordance with the arrangements contemplated by the International Agreement relating to this matter which was signed at Brussels in December, 1924. The list is based in the main on the particulars contained in a corresponding list published by the Office International d'Hygiène Publique in 1935, and arrangements have been made with the Board of Trade for a copy of the list to be supplied to every ship of the Mercantile Marine. It can be obtained from the Stationery Office, price 6d.

NEW PREPARATIONS

AMMOKET is a pleasantly flavoured elixir of ammonium mandelate for the treatment of urinary infections. It is supplied in bottles containing 8 oz. and 16 oz., the 16 oz. bottle being sufficient for eight day's treatment. The manufacturers are Boots Pure Drug Co., Ltd., Station Street, Nottingham.

VIGOREAT RYE CRISPBREAD is a new variety from Sweden of this now popular form of carbohydrate. The flavour is pleasant and the crispness is well maintained. It is supplied in packets at 6½d. for ½ lb. and 1s. for 1 lb., 1lb. being equivalent to 1½ lb. of wheaten bread. The agents for Great Britain and the Irish Free State are J. F. Coffey & Co., Ltd., 14, South Wharf, London, W.C.2.

STUDIO PUBLICATIONS, 1936

A new idea in picture books is the " Frame Book " which is a device for exhibiting reproductions which can be hung or stood on a table. A change of pictures can thus be made at will—a point which will appeal in particular to the invalid confined to one room who will appreciate the variety offered. Six " books " have now been issued each containing eight large colour plates and commentary and the works so far selected are by John Raphael Smith, Peter de Wint, Hokusai, Thomas Rowlandson, and Meryon (12 etchings). Each " Frame Book " costs 7s. 6d. and is published by *The Studio* Ltd., 44 Leicester Square, London, W.C.2. Two other publications by this firm are " Decorative Art, 1936 "—*The Studio* Year Book, and " Gardens and Gardening." These are ideal books for the professional waiting room and they are calculated to produce acute envy in all who peruse them. The price of each is 10s. in cloth covers and 7s. 6d. in wrappers.

THE MEDICAL DIRECTORY

Messrs. J. and A. Churchill, 104, Gloucester Place, London, W.1, the publishers of the *Medical Directory*, write as follows :—

To maintain the accuracy of our annual volume we rely upon the return of our schedule, which has been posted to each member of the medical profession. Should the schedule have been lost or mislaid, we will gladly forward a duplicate upon request. The full names of the doctor should be sent for identification.

THE PRACTITIONER

No. 819 SEPTEMBER, 1936 Vol. CXXXVII

INDUSTRIAL MEDICINE

INTRODUCTION

By the Rt. Hon. Sir JOHN SIMON, G.C.S.I., K.C.V.O., M.P.

H.M. Secretary of State for Home Affairs.

I AM glad to learn that *The Practitioner* is publishing a series of special articles dealing with the subject of Industrial Medicine from various aspects. This is a subject of deep interest to the Home Office, particularly with reference to the employment of measures in factories and workshops to prevent disease and ill-health arising from the conditions of work, and with reference to the provision of workmen's compensation for industrial diseases. The Department is also, though less directly, interested in the work of the medical profession and others in improving the general health of the industrial population and reducing the incidence of common ailments which may to some extent be due to the conditions or nature of their work. The amount of time lost annually owing to sickness must be regarded as a serious matter by those concerned for the welfare of industry.

I have been struck by various changes in the Departmental work since I was previously Home Secretary twenty years ago, which reflect developments in connection with Industrial Medicine. For instance I find that there are now eight Medical Inspectors of Factories as compared with three in 1915 and that there has been a substantial increase in the staff of engineering and other Inspectors who devote much of their time to ventilation and other matters affecting the health of the operatives. Further there is now the Home Office Industrial Museum in Horseferry Road, Westminster, containing groups of exhibits relating to industrial disease, ventilation, heating and lighting, welfare arrangements, and so forth. The number of medical practitioners and other professional people who have visited the museum is an indication of the growing interest which is being taken in such matters. Not without relevance, perhaps, are certain changes in the law—the powers given to the Home Secretary in 1916 to make welfare orders, dealing with the provision in factories of mess-rooms, cloakrooms, washing facilities and so forth, and the requirement in the Workmen's Compensation Act of 1923 of First Aid provision in factories generally. Then there is now the Industrial Health Research Board, set up by the Medical Research Council in consultation with the Home Office. The Board has issued a large number of reports on various aspects of industrial health and fatigue. Other research is carried out under the Council on questions affecting the health of industrial workers, and a special committee of the Council on industrial pulmonary disease was set up not long ago at the instance of the Home Office.

It would hardly be appropriate for me to review here the valuable work of organizations and individuals not directly connected with the Government in gaining and spreading knowledge of industrial hygiene or, in the case of employers, in making arrangements, by the appointment of whole- or part-time works' doctors and in various other ways, to improve the health and welfare of their workpeople, but I feel that I cannot leave these activities without some mention. On the "Workmen's Compensation" side, there have since 1915 been various extensions of the schedule of specific industrial diseases in respect of which compensation can be claimed, and there is a committee under the chairmanship of Sir Humphry Rolleston which advises the Home Secretary from time to time as to whether further diseases can properly be added to that Schedule. Perhaps the most far-reaching change, however, in the last twenty years has been the provision of compensation for silicosis and asbestosis under special schemes, the medical certification for that purpose being placed in the hands of a whole-time Medical Board of experts. The possibility of making similar schemes for some other industrial disease or diseases of the lungs will no doubt depend largely on the researches of the Industrial Pulmonary Disease Committee mentioned above.

Another committee, of which His Honour Judge Stewart is Chairman, is now reviewing the conditions under which compensation should be given for miners' nystagmus—a disease which, in view particularly of its association with neuroses and of its tendency to recur, has been found to present special difficulties in the matter of medical certification and compensation. There is also a committee considering what steps can be taken to improve and develop the arrangements for restoring the working capacity of persons injured in accidents, regard being had to the report on fractures issued last year by the British Medical Association.

All these are important developments but, after all, measures, whether voluntary or compulsory, for the prevention of industrial disease and ill-health depend primarily on the knowledge, skill and co-operation of the medical profession and I feel confident that the articles contained in the present issue of *The Practitioner* will be of great assistance.

THE PREVENTION OF DISEASE IN INDUSTRY

By JOHN C. BRIDGE, C.B.E., F.R.C.S.E.

H.M. Senior Medical Inspector of Factories.

AT first sight it is difficult to appreciate that the prevention of industrial ill-health falls within the scope of the work of the general medical practitioner. He is, however, a link of the utmost importance in the chain of events which leads up to prevention. The general practitioner in the majority of cases, at any rate, is the first to see the workman who is ill, whether the illness is caused by his occupation or otherwise. Consequently, with the practitioner rests the responsibility of bringing to the notice of those concerned with preventive measures any illnesses which he considers due to occupation. This obligation entails considerable care, for no greater harm can be done to a patient than to label the disease due to " employment " when in fact it is otherwise. Vague and vain hopes of monetary consideration, which may be thought to be increased by a prolongation of the illness, are often raised, and the diagnosis so made is bad for both patient and doctor.

Industrial medicine is a misnomer if it is regarded as a special branch of medicine. Lead poisoning occurs irrespective of occupation, yet lead poisoning is often regarded as a disease restricted to industry. Only when the poisoning results from an occupation exposing the worker to the absorption of lead can it then be regarded as a disease of industry. Inquiry into the occupational history is a fundamental aid to the etiology of a case, but even this is, at times, misleading. A man with abdominal colic may not necessarily be suffering from colic due to lead because he is a painter, for many painters nowadays never come into contact with lead paint. Failure to appreciate the possibility of lead poisoning in certain industries has, on the other hand, led to unnecessary surgical interference. The diagnosis of an industrial disease can in most cases be established with a degree of certainty as in diseases of other origin, but to do so rests not on one symptom or the history of a workman's occupation, but on a careful review of the whole clinical picture and occupational history.

One of the important steps in the prevention of an industrial disease is to know when and where such diseases occur. Some of these diseases are rare and, owing to preventive measures, are becoming increasingly so. With prevention in view, under the Factory and Workshop Act, it is the duty of every medical practitioner attending on, or called in to visit, a patient whom he believes to be suffering from lead, phosphorus, arsenical, mercurial, carbon bisulphide, aniline, or chronic benzene poisoning, anthrax, toxic jaundice, or epitheliomatous or chrome ulceration, contracted in a factory or workshop, to notify the case forthwith to the Chief Inspector of Factories at the Home Office, London.

The prevention of ill-health caused or aggravated by conditions of employment is not by any means limited to the poisonings or diseases referred to above. The proof of causation or aggravation is not easy. There are undoubtedly certain conditions of employment which produce ill-health of a kind indistinguishable from those affecting persons not employed in industry. Headache and anæmia occur in occupations in which ventilation is insufficient just as they may from similar conditions elsewhere. Again bronchitis, a disease common among the general population, may often have an industrial origin when, in any group of workers exposed to dust, as, for example, among the card-room workers in the cotton mills, there is an abnormal incidence of the disease as compared with a similar group of workers employed outside that particular occupation.[1]

It is hardly necessary to elaborate the procedure by which preventive measures for the protection of the health of the industrial worker are carried out in this country. The Factory Department of the Home Office is entrusted with the duty of giving effect to the requirements of the Factory and Workshop Act, 1901, and the regulations and orders made under this Act by the Secretary of State in respect of certain trades certified by him to be dangerous. For this purpose, Inspectors of Factories appointed by the Secretary of State have the power to enter all factories and workshops. The factory inspectorate at present includes eight medical inspectors. The primary duty of the factory inspectors is, so far as the general health of the workman is concerned, to ensure that the conditions of ventilation, cleanliness, temperature and the like are satisfactory. Failure on the part of the employer to comply with the requirements of the Act as regards these conditions and all other matters required by the Act renders him liable to prosecution in a Court of Summary Jurisdiction.

GENERAL PRINCIPLES

It is necessary to consider at the outset the channels of entry of the poisons into the body. Unlike poisoning usually met with in practice, absorption through the alimentary tract plays a very unimportant part in cases of poisoning met with in industry. The main channels are (*a*) through the respiratory tract, (*b*) through the skin.

(*a*) By far the most important is the *respiratory tract.* Legge and Goadby many years ago demonstrated the rapidity with which lead poisoning developed in animals when exposed to the dust of lead oxide. That unusual disease of the nervous system, manganese poisoning, of which the mask-like face and the curious steppage gait are signs which can be readily traced to the dust of manganese dioxide, chiefly occurs in workers engaged in the grinding of manganese ores. Vapours of volatile bodies, such as those of tetrachlorethane, producing a condition of jaundice (toxic jaundice), of benzene (the coal-tar derivative, C_6H_6) affecting the blood-forming organs and giving rise to anæmia, described as aplastic, or the nitro-derivative of benzene, with characteristic evidence of cyanosis (anilism), are all absorbed through the respiratory tract. As distinct from these chronic effects, acute symptoms occur—in general, anæsthesia, and death—if exposure is prolonged.

Apart from these vapours, acting by absorption through the respiratory tract, which produce a chronic disease, there are some gases, such as hydrocyanic acid and hydrogen sulphide, which are absorbed through this channel and if in sufficient concentration produce instant death. Other gases, such as chlorine, phosgene, sulphur dioxide, or the mixed gases of the oxides of nitrogen, irritate and set up inflammation of the lungs.

Of the diseases produced by the inhalation of dust, the pneumonoconioses present one of the biggest problems in industry at the present time, and in particular those diseases of the lung produced by specific dusts, namely, silicosis and asbestosis, the one produced by the dust of free silica (SiO_2) and the other by that of asbestos. These dusts occur either in a pure state or in conjunction with dust derived from another substance. The resulting effects on the lung produced by the pure dust present a picture different from that caused by a mixed dust. Not only the concentration, but the size of the particles and their distribution in the dust cloud are of the utmost importance in the consideration of this type of disease. This importance doubtless led to the appointment by the Medical Research Council at the request of the Home Office, of the Industrial Pulmonary Disease Committee.

(*b*) The *skin* as a channel of absorption. During the years 1914 and 1915 toxic jaundice occurred among many of those employed filling shells with explosives containing T.N.T. It was not until the importance of skin absorption was fully realized that the number of cases declined. Anilism and nicotine poisoning are at the present time the most common forms of poisoning occurring in this way.

PREVENTIVE MEASURES

Obviously one method of prevention of industrial poisoning is the prohibition of the use of the substance which causes that poisoning. That this can be effective, the prohibition of the use of yellow phosphorus in the manufacture of lucifer matches, clearly demonstrates. Where prior to prohibition " phossy-jaw " was a disease common among makers of matches, to-day it is a disease unknown. In the early years of the war tetrachlorethane was used as a solvent for the cellulose covering of the wings of aeroplanes and cases of toxic jaundice arose. Once the use of this solvent was discontinued these cases ceased. When an efficient substitute is available the discontinuance of the poisonous substance is therefore a safe and sure method of prevention. When, however, total prohibition is impracticable, reduction of the dosage is a valuable preventive measure. For example, until 1913, in the pottery industry the majority of glazes contained lead in a highly soluble form. By treating the lead so as to form a bisilicate, the solubility of the lead can be so reduced as to render it far less toxic. Leadless and low-solubility glazes are now commonly used in the potteries.

When these measures are not available resource must be had to other measures—viz., prevention of the inhalation of the air containing the toxic substance or disease-producing dust or reducing the concentration below a toxic level. With regard to the former there are two methods by which this can be achieved, the first by complete enclosure of the process, machine, or part of the machine, in such a way as to prevent the escape of the dust, vapour or gas. The difficulty of securing such complete enclosure is considerable, and as an accessory to this a negative pressure has often to be maintained in the enclosure in order to make it effective. The second method and that most usually adopted is to remove the harmful substance by means of an exhaust draught—the draught being applied by means of a suitably designed hood as near as possible to the point where the substance is given off. Effective removal, particularly in the case of a dust, is by no means simple. The design of the hood, the ducts leading to the fan for the production of the draught, the size and speed of the fan itself present a problem which must be solved in every case—a fact not always sufficiently appreciated. There is much yet to be learnt regarding the behaviour of dust particles when generated in a manufacturing process. The results of further study of this problem may affect the views at present held regarding the best methods of securing dust removal. A third method of dust suppression must be recognized, namely, by wetting. To be effective the dust must be really wet, not merely damp.

It must be acknowledged that the concentration in the air of the substance inhaled which can be regarded as toxic is more or less speculative. Legge[2] expressed the view that 2 mgm. (one thirty-second of a grain) of lead absorbed daily, will in time undermine the constitution and set up chronic lead poisoning.

The number and complexity of the volatile substances used generally as solvents or diluents for cellulose, are very great. It is not surprising therefore that knowledge, not only as to their toxicity but also as to the toxic concentration of them in air is scanty. Experiments on animals with some of the more common of them has, perhaps, given some indication. In these circumstances the prevention of poisoning in industry by reducing the concentration of the toxic substance in the air breathed must be regarded as the least satisfactory. It was found, however, that by changing the air of a workroom thirty times an hour when benzene vapour was given off, cases of chronic benzene poisoning which had previously been prevalent, ceased to occur. Benzene, below a concentration of 6 parts per 10,000, is considered unlikely to produce chronic poisoning. The question of the toxicity of these volatile bodies is now under consideration by a committee recently set up by the Medical Research Council. It will be appreciated that apart from animal experiments it is difficult to determine the concentration in the air of any substance, under conditions existing in industry, which produce symptoms. The concentration will vary almost from minute to minute, due to air currents, and from day to day owing to climatic conditions. Information regarding any ill-health suffered by persons exposed to the vapour of these bodies, properly collated, is essential in order to arrive at accurate knowledge of their toxicity.

The least satisfactory of all the methods to prevent inhalation of a toxic substance is by means of a respirator or breathing apparatus, though in certain cases the use of one or other of these, particularly the latter, is the only means of securing safety. Legge stated that "Unless and until the employer has done everything—and everything means a good deal—the workman can do next to nothing to protect himself, although he is naturally willing enough to do his share." Respirators intended to prevent the inhalation of dust are many, and as varied as their efficiency to protect the worker from inhaling those particles of dust of a size and character which are injurious, such as those of silica and asbestos. The efficiency of a respirator depends not merely upon the filtering material but on many other factors, not the least being the fit. Experimental work has shown that a respirator of high efficiency can be produced. Such respirators are of value in manipulative processes in which no other means of protection can be provided.

Breathing apparatus afford protection against gases, vapour and fume, and are, in general, only applicable for emergency; for example, when there is a leak of gas from a valve, or the like, or when a workman enters a tank or still which cannot be cleared of residual gas or vapour. In certain cases the only safe apparatus is one by which the man breathes oxygen or fresh air through a tube attached to a face-piece at atmospheric pressure or under slight pressure. When the concentration of the toxic substance is low, breathing apparatus consisting of a face-piece and absorbent canister can be used. Obviously apparatus of these types can only be worn for a limited period and great care must be exercised to use a canister containing an appropriate absorbent. The provision and wearing of these breathing apparatus are only part of the prevention, for in addition means of revival should always be at hand in case of necessity.

Absorption by the skin would appear to be a simple matter to prevent, and so it generally is, by wearing clothing which protects the skin, and more particularly gloves or gauntlets of rubber or other impermeable material. The most frequent cause of poisoning by this route is due to the accidental splashing not so much on to the exposed skin as on to the clothes. Splashed clothing, if not removed quickly and the skin cleaned (hot water is contra-indicated) continues absorption until it is removed.

SPECIAL PROBLEMS

So far the general measures for the prevention of poisoning and disease in industry have been outlined. There are, however, two diseases in the prevention of which protective measures present great difficulty, namely, anthrax and epitheliomatous ulceration of the skin.

In the case of *anthrax* (at one time known as woolsorter's disease) wool-sorting is now carried out over grids to which exhaust ventilation is applied so as to remove the infected dust. Anthrax of the generalized type is now rare, but cases do arise occasionally from other sources of infected dust, e.g. the handling of dry hides. Imported wool, hair, hides, and skin are the sources of anthrax in industry. Disinfection of the infected material before handling in manufacture is a sure and certain method for the prevention of this disease. The Government Wool Disinfecting Station established at Liverpool in 1921 undertakes the compulsory disinfection of certain classes of wool and hair, imported into this country. As yet not all classes of wool are disinfected compulsorily, and there is no satisfactory method of disinfecting hides and skins. Consequently anthrax continues to occur in industry. The ordinary methods of protection are largely ineffective and reliance has to be placed on the early treatment of all cases by serum, with or without a preparation of arsenic, a form of treatment which has proved eminently successful if adopted at a sufficiently early stage. To this end the practitioner can help by scrutinizing with care, and by taking appropriate steps to arrive at a correct diagnosis in any suspicious cases occurring to a workman employed where anthrax may occur, e.g. tanneries, carpet works, hair and brush industries. Workers are warned against neglect of suspicious pimples by illustrated notices displayed in the works.

As regards *epitheliomatous ulceration* protection of the worker's skin from tar, pitch and mineral oil is in the majority of cases impossible. The carcinogenic properties of mineral oil have been the subject of much research by Twort for the Manchester Cancer Committee. He recommended the use of a mineral oil with certain properties, which his experimental work showed to be of low carcinogenicity to animals. His work also shows that the application of a mixture of lanolin and olive oil to the skin before application of the carcinogenic agent reduces the occurrence of new growths to a negligible quantity. Early diagnosis and treatment are, however, the principal factors to be relied upon in the prevention of skin cancer and as the early stages can now be so successfully and simply treated by radon one looks for a reduction in the future. The long latent period, many years sometimes, of the disease, precludes an immediate reduction whatever method of prevention may be applied.

PERIODIC EXAMINATIONS

Periodic medical examination of the workers exposed to the risk of poisoning or disease affords a further line of defence in industry. In many industries an examination by the certifying surgeon is carried out at regular intervals. By this means workers showing an early stage of absorption or those with some intercurrent disease can be removed from the work exposing to risk. Apart from this the advice of the certifying surgeon maintains a standard of health among these workers. The periodic medical examination of workers in certain processes exposing them to the dust of silica and asbestos is undertaken by the Silicosis Medical Board appointed by the Home Office. The value of this examination is not only the recognition of cases at an early stage, but also the elimination of cases of pulmonary tuberculosis, the frequent complication of silicosis and asbestosis. More complete medical supervision by medical men devoting their whole time to this work has now been instituted voluntarily by some large firms.

References

[1] Report of the Departmental Committee on Dust in Card Rooms in the Cotton Industry, 1932.

[2] Legge, T., on "Industrial Maladies," Oxford Univ. Press, 1934.

PHYSICAL STANDARDS IN INDUSTRIAL HEALTH

By Sir DAVID MUNRO, K.C.B., C.I.E., M.B., F.R.C.S.E.

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CONCERNING physical standards in industry—and indeed about physical standards in general—there is a dearth of well-ascertained data. What *is* known is that a number of candidates for employment of different kinds fail to reach a prescribed standard, which varies widely according to the occupation sought and to the particular criteria employed for assessing occupational fitness. The standards of fitness demanded, for instance, for flying personnel in the Royal Air Force, are different from, though actually in every detail not more particular than, the standards demanded of workers in some branches of industry where special risks to health are involved.

Prescribed standards are arbitrary in the sense that they are usually arrived at as a result of trial and error, and by the practical application of experience thus gained in the various occupations which require—or are supposed to require—different standards. When the Prime Minister, speaking in the House of Commons on June 15th of this year, stated that 35 per cent. of recruits presenting themselves during the last year for the Army had been rejected on physical grounds, he meant that these men had failed to reach that standard of good physique and freedom from physical defect which long experience of service conditions has shown that a soldier ought to possess. In those services, also, in which disabilities contracted as a direct result of service or aggravated by specific conditions of service are pensionable, a strict standard at entry must be maintained; for it is neither economic to the employer, nor kind to the candidate, to accept an individual who is liable to break down under the working conditions of his occupation.

So various are the criteria used for assessing occupational fitness that the term " physical standard " has come to possess a comprehensive definition—at any rate a double definition—embracing the two not identical notions of " good physique " and " physical fitness." The assessment of physique by measurements of height, weight, girth of chest, strength, and so on, is one method of arriving at a standard; the assessment of fitness by testing for functional weakness or disorder (mental or physical) quite another. Yet conclusions based on these two methods—generally, of course, used concurrently, but sometimes independently—are apt to be confused in the one term " physical standard." When it is said, for instance, that the physical standards of the Police Force, of quarrymen, or of miners are high —what as often as not is being spoken of is their physique—it is saying in other words that they are men of " brawn and muscle "; for whom, may it be remarked, industry is coming to have less and less use.

PHYSIQUE AND HEALTH

How far is the possession of " good physique " a guide to the possession of good health? In the report upon the physical examination of men of military age by National Service Medical Boards (commonly known as the C_3 Report) which covered the last year of the Great War, an attempt was made to grade men according to their fitness for physical exertion. This report contains the results of a physical census on the largest scale, and in the greatest detail ever undertaken in the country, and remains a landmark for the student of physical standards. Some two-and-a-half million men of military age were medically examined and in their subsequent grading into four divisions a criterion of physique (the so-called " Index of Physical Fitness ") was largely used. Moreover, it was claimed that a fairly close correspondence had been found to exist between gradings made by this criterion and the results of medical examinations.

Considerable alarm was caused in the country by that paragraph in the Report which summarized the results of the gradings. In every nine medical examinations, it was stated, only three men were found to be fit and healthy; two were in a definitely infirm state of health and strength, whether from some disability or failure in development; three were incapable of undergoing more than a moderate degree of physical exertion; and the remaining one was a chronic invalid with a precarious hold upon life! About the men in grade 3 it was written that "they could almost (in view of their age) be described as physical wrecks."

That this grading, practically speaking, corresponded to the Army grading of C_3, gave its popular name to the report. The alarm caused by these statements subsided, however, when it was pointed out that except for youths in the eighteen-year-old group the men examined could not be held to be a truly representative sample of the nation's manhood, and that the best men had already been taken into the fighting ranks. Doubt was also cast on the validity of the "Index of Physical Fitness" (derived from existing anthropological data by Keith) as a criterion. The report, however, gave much information of value on the relation between physical condition and occupation. Agricultural labourers, for instance, showed the best physical condition—then in descending order miners, engineers, iron and steel workers, lace workers, textile workers, and lastly tailors. How much this was due to comparative healthiness or unhealthiness of the occupations, and how much to self-selection—that is to say, that only the stronger and fitter men were to be found in the heavier occupations—was naturally not inquired into, for it was not a war problem. More important was the finding among youths, at an age when now they would most of them be in the initial stages of an industrial career, of a mass of defects many of which might have been remedied had they been taken in time.

Since the War it has been very difficult to obtain systematic recorded data about the physical condition and state of health of any large groups of individuals.

(1) *Physical condition alone.*—In this country, apart from some data collected in schools (and recently the physique of boys at school leaving age has come in for criticism) and in the Government Services there are few available sources of information, and from industrial firms none, as far as I know, that has been published.

In industry post-war knowledge on this subject is derived mostly from the investigations directed by Prof. E. P. Cathcart for the Industrial Health (formerly Fatigue) Research Board and published by the Medical Research Council in the Board's series of reports (*The Physique of Women in Industry—A Contribution towards the Determination of the Optimum Load* published in 1927; and *The Physique of Man in Industry* published in 1935).

Examination of representative samples of men and women engaged in industrial processes of all kinds and involving all types of work, from light sedentary to heavy, formed the bases of these reports. Among both men and women there was a sample of unemployed. More than 4,000 women and 13,000 men voluntarily submitted to the examination, which involved measurements of height, distance of finger-tip from ground, and weight, and dynamometer tests for strength (lumbar pull and hand grip).

The value of the examination would naturally have been greatly enhanced had it been possible to include physiological tests for fitness (e.g. as done in the entrance examination for the R.A.F.) to add a medical examination for the detection of physical or pathological defects, and to collect evidence about states of nutrition. Medical examinations, as will be referred to later, of industrial workers en masse are impracticable in investigations of this kind; and, as has been well said by the chief author of the reports:—" there is no yard-stick for measuring nutrition." Apart, however, from elucidating various physiological points of practical importance to industry, such as the optimum load for women, young persons (and the best methods of carrying it), and the average comfortable height from the ground of a working bench, much valuable information is provided in these reports concerning physical types of individuals in employment, and also some tentative explanations concerning the relation between physique and selection of occupation. In addition to indicating the physical requirements necessary for those entering occupations which demand a good physique, there was also much interesting information about the deterioration of physical qualities with age and concerning the geographical distribution of stature.

On these data, taking physique alone, there does not appear to be any valid evidence that the physique of the industrial worker is deteriorating, any more than there is evidence to this effect about the general population. On the contrary, improvements in nutrition and care in early life, in dress, and in opportunities for outdoor recreation must all be factors tending to improve the physique of the boys and girls from whom industry draws its population. The authors of the above-quoted reports were also unable from their data to determine to what extent heavy industries are attracting men of superior physique or to what extent mechanization has equalized the demand for brawn and muscle; and they were quite clear that from the making of physical measurements alone no certain index of physical fitness, industrial or other, has yet been discovered. In other words, as from the C_3 Report, so from these reports it appears that physical states of health cannot be deduced from measurements of physique; though this does not mean that no connection exists between them.

(2) *Physical condition combined with states of health.*—In preparing the reports above referred to, the authors went to much trouble in collecting data of examinations in which attention is paid both to physical measurements and to states of health, e.g. in the examination of candidates for the public services. A chief source of such data is to be found in the annual health reports of the Fighting Services. The candidates for entry to these services, however, form a selected group to begin with—moreover standards are apt to be altered from time to time, as demand exceeds supply. For these, and other reasons, it has not so far been found possible to show a relation, of the order which statisticians demand for proof, between data collected on physique and the numerous defects generally revealed by medical examinations.

Nevertheless, from annual health reports of the Services as from the C_3 Report, it emerges that many of the defects for which recruits are rejected are due to causes which if taken in time could have been remedied. Among such may be enumerated defects of the middle ear and loss or decay of many teeth, which always take a high place in the order of causes of rejection. As to whether these causes are on the increase or not, again there is no definite evidence, but from recent figures there does not on the surface appear to be a decreasing trend. In addition to the contents of the annual reports issued by the Fighting Services, there is of course other information recorded about physique and state of health, both of entrants and workers, in other public Services and bodies, and a few large industrial firms. Little of this has so far been available.

In industry itself, practically nothing has been known about the physical condition and causes of rejection of entrants, and until recently there has not been any organized effort to collect such information. As regards official machinery for doing so—under the Factory Act young persons under sixteen are examined by certifying Factory Surgeons, but only for fitness for employment for the full period allowed by law in certain specified occupations. Moreover, the Act does not provide for any medical examination of young persons subsequent to entrance into industry except in individual and rare cases. There are many reasons, into which it is not proposed to enter, why this at the moment is the best which can be done.

MEDICAL EXAMINATIONS AND THE WORKER

The subject of medical examinations is a sore one with industrial workers; they do not like them. To quote from the introduction to the fourteenth Annual Report of the Industrial Health Research Board :—

> These objections on the part of the worker are easy enough to understand, and are due partly to the spectre of unemployment which is always before his eyes, and in part because there are many things about medical examinations, as he has experienced them, which offend his sense of fair play. To both of these factors is due a suspicion that if the slightest physical defect is shown in the examination, it will be recorded against his name, and should the management have anything against him may serve as an excuse to get rid of him; for he must know that physical unfitness is often an excuse for dismissal. He also knows that there is a constant change going on in mechanical production, demanding more exacting conditions, and he fears that when new mechanization is introduced and his old process goes, these personal records of physical examinations will be used against him, and he will find himself regarded as not physically efficient enough to be retained."

As regards unofficial machinery, it is only within the last few years that industrial firms have come to realize the value of attaching a whole-time works' doctor to their staff. This remark does not apply to a few enlightened firms, but until lately it was true in general. If is, of course, only the large firm that can employ a whole-time doctor, but when one is employed, he or she is not now regarded as a luxury. These doctors are now better placed than any other agent for obtaining knowledge about the physical standards of entrants into industry—for, noting the causes of rejection, and for observing how the health of the accepted candidates stands up to the conditions of work in their various occupations—because observations on these points is part of the works doctor's daily routine. Apart from exposure to well-recognized hazards such as lead, many effects of conditions of work still remain obscure, e.g. effects of exposure to toxic solvents. Information on the effects of conditions of work at present obscure cannot be confirmed unless by medical examinations repeated over a number of years and often can only be obtained after long-range preliminary research. The necessity for repeated examinations was pointed out by the senior medical inspector of factories in the last Annual Report of the Chief Inspector, in which, after enumerating some of the difficulties (which have been mentioned above) in obtaining systematic medical examinations, he concludes: "At present these obstacles are difficult to surmount, but the fact remains that the opportunity for gaining valuable information is being lost." He also pointed out that in assessing effects of employment the social and economic conditions affecting the examinee must be considered at the same time.

Opportunities now appear to be opening up for gaining this valuable information. An impetus has come through the recently-formed group of industrial doctors known as the Association of Industrial Medical Officers (*see* p. 391), which is in close touch with centres of teaching and research, such as the Industrial Health

Research Board and the London School of Hygiene and Tropical Medicine; and a start has already been made with an attempt to co-ordinate the various details of information on physique and health, which it falls to the lot of whole-time medical officers to record for their firms.

All occupations, of course, do not demand the same physical standards, but if a reasonable and simple classification were made into occupations involving light, moderate and heavy work, the resulting data concerning accepted and rejected candidates would throw much light on the industrial standards of physique and health needed. As a first step the various forms used by different firms for recording medical and physical data are being analysed. As might be expected, many differences in the desiderata are being found, for standards in industry can neither be rigid nor uniform throughout an industrial world where occupations vary so widely.

OTHER FACTORS

I have so far touched only on physical factors in the determination of health standards (however rough) in industry. There are other factors, which are likely in time to attract a large part of the attention of medical examiners. Vocational selection, by means of general or specially devised vocational tests (e.g. intelligence, sensori-motor and so-called analogous and analytic tests) is no longer a mere ideal—and for the past fifteen years and more vocational fitness for particular occupations from a psychological standpoint has been the subject of intensive research. Some of the tests employed are becoming standardized (i.e. they are passing out of the stage of experiment into the stage of practical application). This, for example, applies to tests for personal characteristics comprised in the term "accident proneness." If liability to accident can be predicted, the practical importance of such fore-knowledge is obvious, not only for preventing a proportion of industrial accidents, but for lessening the toll of the road. It is common knowledge that the occurrence of accidents whether at home, in the factory, or on the road is not entirely governed by chance, but happens most frequently to certain types of individuals, commonly called "clumsy." Given equal exposure to risk, three-quarters of these accidents have been shown by statisticians to occur in a group which comprises one-quarter of the people at risk. There are now tests in practical use which have been proved to detect beforehand at least some of the personal factors in accident-proneness—and these, or some form of them, are likely to be taken into general use in the future in the fixing of physical standards.

Industrial psychology certainly has a contribution to make towards the ascertainment of standards of health, and using the word "health" not only in its widest sense—for it is a truism to state that much of the sickness absence in industry is due to other than purely physical causes. The wrong man or woman in the wrong job—the wrong individual in authority, may mean as much as bad environment and bad physical health in causing sickness and break-down. It is becoming more and more possible to measure and assess the various capacities in the mental make-up of individuals, so that they can be tested for these capacities on entry into their occupations. But predictability is another affair. Presumably a man who possesses mechanical aptitude in high degree—and the capacity can be assessed with some accuracy by tests—will continue to possess it and to use it. Of many human capacities, however, it is impossible to predict whether young people possessing them will use them to advantage throughout their careers—or let them go to seed!

INDUSTRIAL ABSENTEEISM

BY N. HOWARD MUMMERY, M.R.C.S., L.R.C.P.

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THE 1935 report of the Factory Department of the Home Office shows that there were nearly 163,000 factories and over 83,000 workshops in England and Wales. Collectively these employ some seven million persons and the "industrial absenteeism" referred to is the working time lost by these workers on account of illness, injuries or industrial diseases. To the management of any industrial concern the financial aspect of this lost working time by trained factory operatives, supervisors, or clerical staff is a serious matter and one that forms no small part of the many problems with which medical practitioners on the staffs of large industrial firms have to deal. So many varied and complex factors are involved in absenteeism, both from the view point of the employer and the employee that it is not altogether surprising to find a lack of uniformity between more or less comparable firms as regards the incidence and the duration of absenteeism, and between the means adopted to keep it within reasonable bounds. Yet facts and figures certainly are not lacking to indicate the necessity of individual and collective action to reduce the truly appalling amount of more or less preventable absence from employment. Apart from holidays, lost working time is due either to illness, injuries or occupational diseases. Each of these will be dealt with briefly and means, which experience has shown to be useful and practicable in preventing undue or unnecessary absence, will be suggested, although it will be readily understood that the nature of the work, the conditions of the employment, the housing of employees, the attitude of the management, and various other factors, differ so much in industrial localities and individual firms that the same means of dealing with the problem cannot be expected to prove equally successful with all.

ABSENCE DUE TO ILLNESS

It has been computed that about 50 per cent. of the fifteen million insured population in England and Wales "go on the panel" every year and it is stated that over thirty-one million weeks' working time are lost annually by industrial workers through sickness alone. The average annual duration of sick absence has been variously estimated and is roughly ten days for men and twelve days for women. But these figures, based as they are on the returns of Approved Societies operating National Health Insurance benefits, do not include the first three days of each period of absence nor absences of three days or less. These short absences actually amount in the aggregate to a further considerable figure and in the case of skilled workers, especially those on team-work, lead to dislocation of factory processes, undue burden on others, and falling off in output. Further, it is worthy of note that, although the standard of life among the working population has risen and mortality-rates have fallen during the past fifteen years, various returns show that there has been a steady increase in the annual sickness claims and the duration of sick absence, including the absences of three days or less, has increased from an average of sixteen-and-a-half days to twenty-eight days per person. A number of factors contribute to these increases and to the general high rate of lost working time in this country. First among these is the greater medical and surgical care that the working classes receive. Second is the increased consideration of employers for the health and well-being of their work people. It is common in these days, at any rate among the larger business concerns, for the firm to pay at least part of the difference between full wages and panel benefits during unavoidable sick absence of regular-staff employees. When this is not done the sick employee naturally cannot afford to be away and tends to return to work before full recovery has taken place or in some cases before he has ceased to be a danger to others with whom he comes in contact. This leads to the risk of permanent damage to health, later longer absence, or the spread of infection in work rooms. Undoubtedly the firm that adopts a policy of discontinuing all wages during sick absence can claim to show less lost working time, but at the cost of lowered efficiency, increased invaliding and a decline in the contentment and general well-being of its workpeople. Another factor, and one undoubtedly responsible for considerable unavoidable sick absence, will be found in certain defects in National Health Insurance certification, particularly the tendency to issue final declaring-off certificates weekly or only on certain days of the week and the difficulty even the most conscientious insurance practitioners often experience in dealing with certain types of panel patients who seem to think they have a statutory right to so many weeks on the panel funds each year—a somewhat natural way no doubt of securing a needed rest from the monotony of work. In this connection must be mentioned the bugbear of all industrial doctors, namely "nervous debility," which looms so large among the diagnoses on panel certificates and generally is due to some mal-adjustment of the individual to one of the many little problems, at work or at home, with which the life of everyone is beset. The patients are usually females and they continue to do their household work while receiving the gossip and sympathy, or envy, of their friends. If the case is genuine its cause must be elicited by sympathetic personal inquiry and if possible removed, when a brief respite from the home environment will usually effect a cure. Notwithstanding these criticisms, and fully admitting that there is abuse of the employer's time and the Approved Societies' funds, the vast majority of industrial workers are genuinely anxious to return to work without any undue delay and it is evident that a little time spent in considering their mental attitude as well as their physical state contributes largely to curtailment of unnecessary absence.

ABSENCE DUE TO INDUSTRIAL DISEASES

In certain trades and industrial processes the employees are exposed to recognized health hazards owing either to the conditions in which they have to work or to substances with which they come in contact. The pulmonary diseases of miners and their well-known neuroses, silicosis, lead poisoning, chrome ulceration and the various other lesions caused by chemical substances are common examples of these, and any disease which has been shown to have an industrial origin, and therefore has been scheduled by the Factory Department of the Home Office as such, becomes an industrial disease within the meaning of the Acts. Among these industrial diseases "dermatitis" plays no small part, and, as particular attention has to be paid to it in the branch of industrial medicine in which I am engaged, I can at least indicate some points regarding it that are important as regards absenteeism. Skin diseases of all kinds are no more common among industrial workers than among other members of the general community. It is recognized that tar, oils, strong alkalis, water maceration from washing and scrubbing, furniture and floor polishes, dough, sugar and a number of other substances may set up a dermatitis in susceptible persons. It is known that in the modern home, as well as in the factory, various irritating chemical substances are in common use and that in the latter certain safeguards are used to mitigate their effects that of course are not even thought of in the homes of the people. Consequently, given a case of dermatitis " due to dust or liquids," as the Act terms it, it is not only necessary to determine its cause but also to decide whether the condition is domiciliary or industrial. Another difficulty commonly experienced is due to the fact that the word " dermatitis " is so commonly used on panel certificates to cover all and every type of skin lesion. This may save time and trouble but it leads the N.H.I. societies to withhold benefits, on the supposition that the disease is industrial, causes endless confusion, and occasionally leads to litigation. True trade dermatitis is, however, common enough, and the means of limiting absence due to it is dealt with later in this paper.

ABSENCE DUE TO INJURIES

Recent official returns show that in the seven great industrial groups no less a sum than five-and-a-half million pounds was paid in one year in respect of compensation to workmen for industrial accidents, and a sum of ten-and-a-half million pounds in the same period for all industries and employments under the Workmen's Compensation and Employer's Liability Acts. These figures give some idea of the amount of lost working time involved, for " lump-sum " compensation payments are but a small proportion of the total disbursements made to injured workmen. The report of the Chief Inspector of Factories for 1935 shows 136,858 reported injuries and 785 deaths, but these figures do not include the large number of accidents involving incapacity for work for periods not exceeding three days. The industrial doctor is often called upon to assist in accident prevention, but his main work lies in the immediate treatment of injuries and in conducting or supervising the subsequent treatment with a view to securing recovery and restoration of full function with the least possible delay. To that end a properly fitted remedial and rehabilitation centre at the factory clinic equipped with X-rays is invaluable, as by encouragement and close personal supervision the injured workman can more readily be induced to use the restored function of the injured part. With skilled massage and graduated exercise he regains confidence in himself and is ready to start a light job far sooner than would be the case if after the broken bone has united or the wound healed he is discharged from hospital attendance to remain idle at home, when long absence from work and the possibility of a final lump-sum compensation payment leads him to exaggerate some minor remaining disability. This should seldom occur if all such accidents are treated at the factory clinic throughout or as soon as hospital attendance is no longer essential. It will usually be found also that the workpeople themselves very much prefer to attend the clinic, where they are known personally to the staff, rather than hospital, where they are among strangers.

PREVENTION OF ABSENTEEISM

In theory a substantial reduction in industrial lost working time can be effected by medical examination of all applicants for employment and the rigid exclusion of all but the perfectly healthy and strong, and by submitting these to psychological and dexterity tests in a process of vocational selection, by withholding wages during sick absence and by dismissing all employees who show undue frequency or duration of absence, or are beginning to show signs of advancing age. The smaller firms with limited financial resources are unable to assist absent employees and rely upon statutory and philanthropic health services to do all that is necessary for them, but in up-to-date business concerns an ever increasing number are making adequate provision through welfare departments to assist their staff by supplementary services, financial help and the provision of clubs and sports grounds, and they appear well satisfied that it is both good business and good citizenship so to do. The medical examination of applicants for work is absolutely necessary in any large firm, but its object is to find work suitable for as many of them as possible including those who in spite of some physical handicap can still work safely and efficiently and earn normal wages in some part of the plant. Very often these handicapped workpeople are far better time-keepers than the young and physically fit who have more outside distractions. There are, of course, certain disabilities which lead to rejection owing to the risk of aggravation, danger to others, or undue risk to the employer or the public he serves. In a food factory, for instance, certain skin states or diseases absolutely prohibit employment owing to hygienic considerations or the susceptibility of the individual to the substances with which he, or she, will be in contact. But in many years' experience it has been found that rejections seldom exceed 3 per cent. Against vocational tests on engagement the main objections of managers are the amount of time they involve and the known fact that a worker seemingly clumsy at first may later develop considerable manual dexterity. The granting of wages during part at least of sick absence, if adequately controlled by visits to the firm's medical officer or the domiciliary calls of the firm's sick visitor, is on the whole a means of preventing undue absence. It is also humane, as a serious financial loss during illness adds mental anxiety to the physical trouble and certainly mitigates against recovery. The dismissal of those whose state of health necessitates frequent or long absences is unfortunately unavoidable in certain cases, but is not done in a well-managed firm until its medical officer has fully investigated all the circumstances and considered the possible value of obtaining a specialist's opinion on the case, or the advisability of change of occupation. The compulsory retirement of older employees while still capable of useful work is generally a mistake. Their experience and reliability usually compensate for some falling off of physical energy. Investigations have proved that actually a group of workpeople over 70 years of age showed less absence than a group of young workers, though it was noted in this comparison that while the latter were away more often, the former if taken ill tended to be away longer owing to a waning of recuperative power. The importance of clean, light, well-ventilated and warmed work rooms, adequate washing and lavatory facilities and provision for recreation and sports, needs no emphasis in these days, and the provision of wireless or gramophone music during working hours relieves the monotony of employment. The general experience of providing health services for large groups of industrial workers has been that its advantages are reflected, not only in certain administrative economies, but in happier, healthier and more efficient workers. These advantages cannot all be given a cash value but are in themselves an adequate return to the management.

As regards the surgical work of a factory clinic, a very considerable amount of lost working time is saved by insisting that all cuts and abrasions, however trivial are at once reported to the doctor or trained nurse in attendance. Sterilization of these slight injuries followed by occlusive dressings will prevent septic infection otherwise so common. Similarly all skin rashes should be reported to the works' medical officer immediately they appear, and the forewomen should inspect all girls' hands at least weekly. In this way the earliest signs of the various dermatoses can be recognized, treated and generally cured before secondary infection or unsuitable applications give rise to a dermatitis which may mask the original lesion and necessitate absence from work. By far the commonest of these skin diseases are the seborrhœide lesions. They respond readily to treatment if the usual source of the infection in pityriasis of the scalp is recognized and adequately dealt with. Another common condition is pompholyx for which nothing seems so suitable as daily painting with liquor picis carbonis. Early eczemas due to reaction to various irritants are also usually readily amenable to cure by the same means supplemented by the use of an anhydrous fatty ointment containing the same active principle. Indeed the industrial medical officer will find that a close study of the various dermatoses met with, and routine methods for their treatment when possible at the factory clinic, will amply repay him in the great saving of lost working time he will effect. If these cases go to the insurance practitioner, or even to the hospital out-patient department, they are usually seen only once a week and given treatment which may or may not be adequately carried out, and too often washing and other household duties greatly delay recovery. Recovery from illness, and resumption of work can often be accelerated by a brief period of change of air and surroundings at a convalescent home at the seaside, and most large firms have arrangements for sending their employees to such homes on the recommendation of the factory medical officer, who acts in agreement with the patients' own practitioners, with whom friendly co-operation should always be established.

MALINGERING

Among industrial workers true malingering is exceedingly uncommon. When it exists to any great extent the reason will be found in faulty handling of the individual, either by the works' medical officer, the panel practitioner, or the hospital staff. The average man or girl wants to get back to work as soon as possible and very often before it is wise to allow it. There is, of course, a tendency on the part of many workpeople to attribute to their employment every ache or pain, indeed any and every ill by which mankind is afflicted may be "blamed on the job." Lumbago is usually called a strain while lifting, as sometimes it may be, and rheumatic or fibrositic affections may be attributed to over-exertion. This, however, is natural enough among the class concerned and usually the origin of the complaint can be cleared up in a friendly and sympathetic explanation by the works' doctor who will in all cases of an alleged injury make a careful physical examination and refer to the employee's casualty records. He is then able to state whether he can support a legitimate claim against the Assurance Company or, alternatively, he may be able to point out from the previous history and signs present the real origin of the disability. It is often necessary also to write to the workman's panel doctor who may be unaware of his exact employment, his previous records, and the conditions found on first examination for employment. When the staff of a firm includes a medical officer who sees all accidents at the time of their occurrence, or very shortly thereafter, there is very little opportunity or incentive for malingering. A valuable asset in dealing with any undue absence is provided when the firm pays its employees the difference between panel sick benefits, or accident pay, and their full wages subject to its medical officer's reports on each case being satisfactory. Informing the patient that this grant has now been exhausted invariably terminates any unnecessary absenteeism.

INDUSTRIAL POISONS

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KNOWLEDGE of industrial toxicology began very early in the history of civilization, for physicians of Ancient Greece knew that breathing the fumes of lead might cause colic and paralysis. In contrast substances which were little more than chemical curiosities twenty years ago have now found extensive use in modern industry. They include coal-tar derivatives, chlorinated hydrocarbons and ketones. Some of them are harmless, others so deadly that they would be better forbidden; some are absorbed by inhalation, others through the skin; some attack the liver causing toxic jaundice, others the kidneys causing suppression of urine; some affect the blood causing cyanosis, others destroy the bone marrow causing hæmorrhagic purpura and aplastic anæmia. Lead poisoning is of the greatest importance and will therefore be dealt with first. Following this, the most important of the other chemical substances will be discussed and in addition a brief description will be given of the toxic gases commonly encountered in industry.

OCCUPATIONAL PLUMBISM

Under the Factory Act, 1901, the notification of lead poisoning occurring in a factory or workshop is compulsory upon medical practitioners and has to be made to the Chief Inspector of Factories, Home Office, Whitehall. Under the Lead Paint (Protection against Poisoning) Act, 1926, it is compulsory to notify lead poisoning contracted by any person employed in connection with the painting of any building whether or not that building be a factory or workshop. Lead is now encountered in more than 200 industries. The annual world production of pig lead exceeds 1,500,000 tons, and in England alone more than 25,000 tons of white lead and 20,000 tons of red lead and litharge are manufactured annually. To-day in this country there are more than 1,500 workers in the lead industries and 150,000 painters.

Exposure and Absorption.—It has been known clinically for more than a hundred years that absorption of lead through the respiratory tract is very much more important than by the gastro-intestinal tract, and this view has since been amply confirmed by experiments on cats. In the prevention of dust and fumes great success has been secured from the application of the principle to apply methods entirely external to the workman—methods over which he himself can exercise no control. One such method is exhaust ventilation applied through hoods at the point of origin of dust or fumes. The hygiene of the workshop and cleanliness of the worker are both important. Benches, tools, floors and walls must be spotless, often at the expense of the constant vigilance of several good foremen. No scrap lead nor dry white lead should be handled unless it has been thoroughly soaked by the use of a hose. As far as possible mechanical means, such as cranes, rails, hoists, covered conveyors and hoppers, and automatic packing machinery must be substituted for hand carriage. Since 1899 the lead manufacturers in this country have spent over £200,000 on alterations and dust-removal plant in order to render more healthy the conditions of employment. Fortunately about 50 per cent. of the white lead manufactured in this country is never handled in the dry state. It is made by the stack process and leaves the stack in a wet state to be converted into an aqueous paste, mixed with linseed oil, and made into an oil paste in automatic closed-in machines without dry grinding. Since a white-lead worker may handle in the course of a day at least as much white lead as a painter handles in a year, the value of the wet pulping method will at once be seen. In the manufacture of litharge and red lead it is impracticable to use wet methods, and it is therefore necessary to use machinery designed to minimize dust. Recently a damp rubbing down process has been introduced whereby the evils arising from dust in the painting trade may be overcome. A satisfactory waterproof sandpaper is now available for use in a vessel of water. A painter nowadays is very rarely exposed in mixing paint from the dry material, because it comes to him already mixed in oil.

THE CLINICAL HISTORY.—The case histories of fifty-five patients exposed to lead who have attended the author's out-patient department in the last five years have been analyzed. Only one was a woman. Thirty-six of them were judged to be suffering from toxic episodes and nineteen of them to be free from poisoning. Their occupations were as follows:—painters (10), white-lead stack workers (6), enamellers (6), smelters (5), accumulator burners (5), accumulator pasters (4), colour grinders (4), litharge makers (2), casters (2), flue cleaners (2), metal finishers (2), plumbers (2), a cooper, a slate mason, a bullion refiner, a perambulator maker, and an embroidery stenciller.

The exact details of the work he does should be elicited from the patient himself. Often a man's occupation does not at first sight suggest that he is exposed to compounds of lead. A man describing himself as a fitter may be exposed to dust or fumes of lead; this fact is only elicited in answer to a leading question. The occupation of a cooper becomes dangerous when the barrels worked upon have contained compounds of lead. Enamellers working, for example, on baths, sift a powder containing lead silicate on to the bath which has been heated in a furnace. They sometimes use a compressed-air apparatus which forces the enamel through a sieve. Lead smelters are exposed to the fumes and dust of the furnaces and flues. Lead burners in the electric accumulator trade use an oxy-acetylene or oxy-hydrogen flame to weld terminals to accumulator plates. Pasters fill the spaces in accumulator plates with a paste containing litharge and red lead. Colour manufacturers grind colours into a fine powder under edge runners with the necessary production of much dust. Amongst other things they grind lead chromate and red lead. Recently mass production methods in the motor car industry have provided a new lead hazard. A solder of lead and tin is used to strengthen the welds in the steel body-work of motor cars. A final treatment of the body surface, and especially the soldered parts, by a portable grinding disc gives rise to uncontrolled dust containing lead which may be inhaled not only by the metal finishers engaged on the actual process but by others in the vicinity. A slate mason may construct storage tanks by fixing together slabs of slate with materials containing oxides of lead. A bullion refiner may use the cupellation process in which he adds lead to refinable silver in a furnace and taps off molten litharge. A rubber compounder adds oxides of lead to crude rubber in preparation for vulcanization. A girl describing herself as a perambulator maker was employed painting the body work of perambulators and then rubbing down the surface with dry sandpaper. An embroidery worker was found to stencil coat materials by dabbing on the pattern commercial white lead where chalk had been intended.

Diagnosis.—Individual opinion differs widely as to what is necessary for the definite diagnosis of lead poisoning. The diagnosis of intoxication as distinguished from absorption must be based upon evidence as to the presence of one or more of the toxic episodes. These are colic, palsy, anæmia and encephalopathy.

Constipation and slight stippling of red cells are insufficient without one of the toxic episodes to establish a diagnosis of poisoning. In studies of lead excretion it is to be noted that no satisfactory figures can be obtained unless specimens of stools and urine are collected for at least three days. The figures quoted below represent the average excretion calculated for each twenty-four hours, and as such they form an approximate guide only. As a consequence of the occurrence of lead in the soil and hence in vegetation and animal food, normal individuals with no occupational exposure to lead may excrete lead in the fæces and urine. The mean lead excretion of a group of Cincinnati medical students was found to be 0·24 mgm. for each twenty-four hours in the fæces and 0·08 mgm. in the urine.

A man working in a dusty lead industry, in addition to inhaling lead, may swallow repeated small amounts and pass lead unabsorbed in the fæces. Therefore the only proof of absorption is to find lead in the urine. If specimens be taken some weeks after removal from exposure, the output may reach about 1 mgm. for each twenty-four hours in the fæces and about 0·3 mgm. in the urine. It seems doubtful whether renal excretion ever much exceeds this figure under any circumstances. However, under treatment by ammonium chloride the fæcal excretion may rise to about 2 mgm. in each twenty-four hours. It is necessary to emphasize that the presence of lead in the excreta is not necessarily proof that a lead worker is suffering from lead poisoning. Many such workers are insusceptible and have never suffered from any of the toxic episodes.

Lead colic.—This is the most common and dramatic of the acute manifestations of plumbism. It is probably ten times as common as lead palsy. An acute attack of colic is usually preceded by several days of constipation. The pain is of a tearing or griping nature and of variable intensity. It is usually situated around or below the umbilicus, and the patient often indicates where it is by spreading both hands widely over the lower abdomen. While suffering from colic the patient is cold, pale, and often drenched with perspiration. He commonly bends over and may writhe about the bed in intense pain. Examination shows a scaphoid abdomen, held tense, but not showing any true rigidity. Vomiting quite frequently occurs at the onset of the pain.

Lead palsy.—Paralysis does not appear to be closely related to length of exposure. It may develop during the first month of work, or only after many years' exposure. The commonest form is the well-known wrist-drop. This often begins in the long extensors of the middle and ring fingers. It spreads to the other fingers, and then to the long extensors of the wrists. The supinator longus, and usually the long abductor of the thumb escape. The brachial type of paralysis involves the deltoid, biceps, and supinator longus, but it is very rare for this to occur without wrist-drop. A third form of lead palsy in which progressive atrophy occurs of the thenar and hypothenar eminences, together with the interossei, used to be common in the left hand of file-cutters. In view of the theory that fatigue plays an important part in determining the site of lead paralysis, this observation is of great interest, for in their work file-cutters not only used particularly the muscles mentioned but placed the greatest strain upon the left hand. The substitution of machine methods for hand labour has abolished lead poisoning amongst file makers. Lead palsy rarely occurs in the lower limbs, but when it does so it affects the extensors of the toes, giving rise to foot-drop.

The lead line.—The lead line consists of fine granules of pigment arranged in the form of a stippled line within the tissues of the gum about a millimetre from the border of the teeth. It is more marked round infected or dirty teeth, and is occasionally found on the mucosa of the cheek opposite such teeth. In spite of the fact that the pigment lies actually within the tissues and cannot be rubbed off, careful cleansing of the mouth and teeth is often found quickly to eliminate the line. Its clinical significance should be clearly recognized. It is an indication of absorption only and not of intoxication. Its intensity and size provide a rough guide to the duration and severity of exposure to lead.

The anæmia.—Studies of lead anæmia have shown that the toxic action occurs peripherally. Stippled cells are never found in the bone marrow in lead poisoning. The presence of punctate basophilia in the blood is not, of course, a specific sign of lead poisoning. It is seen in pernicious anæmia, in leukæmia, in the anæmias of carcinomatosis, and in pneumonia in infants. Its occurrence in these various conditions is relatively rare and slight as compared with the frequency and intensity of its appearance during plumbism. For this reason the demonstration of stippling of the red cells in the blood has come to be considered as almost definite evidence of absorption of lead. It is not an absolute indication of the severity of lead poisoning, but it often runs parallel to the state of health. If on examination of the films its presence is detected in a sufficiently large number of fields of the microscope, further exposure to lead in the patient concerned should be prevented immediately. Punctate counts are of extreme value in the prophylaxis of plumbism among lead workers and are essential in the adequate hygienic control of lead processes. Because of the loss of circulating red cells there is compensatory regeneration of the erythrocytes with a high reticulocyte count. The secondary anæmia is usually mild, and it is rare to find less than three million red cells per c.mm.

Encephalopathy.—This is the most dramatic manifestation of lead poisoning and is always of serious prognostic significance. In severe cases of plumbism the patient is dull, with poor memory, and inability to concentrate. The onset of encephalopathy is nevertheless sudden, usually with epileptiform convulsions. It may be divided into three groups—convulsive, comatose, and delirious. Most of the ancient writers speak of the frequent occurrence of convulsions in lead poisoning, but fortunately with the improvement of industrial conditions the incidence of lead encephalopathy has progressively decreased, until to-day cases are very rarely seen.

Additional manifestations.—Abortion was common among women who worked in the potteries in the days before protective measures were in operation. The question of the extent to which chronic nephritis is a significant sequela of lead poisoning is still controversial, but its incidence in lead workers is sufficiently high as to leave no reasonable doubt that lead is capable of attacking the kidneys.

DIFFERENTIAL DIAGNOSIS.—There is to-day a grave danger of wrongly attributing to lead poisoning all symptoms occurring in persons exposed to lead. Acute appendicitis, chronic gastric or duodenal ulcer, and carcinoma of the stomach occur from time to time in lead workers. They must be carefully differentiated from colic. Equally a lead worker can suffer from pernicious anæmia or secondary anæmia due to piles, melæna, or hæmatemesis. It is important to remember that lead poisoning has to be very severe indeed before the red cell count drops below three million. In industrial cases confusion is unlikely to occur in regard to the blue line. A similar phenomenon is commonly seen in patients under treatment by bismuth preparations given intramuscularly. The differential diagnosis of lead palsy should give rise to no difficulty especially as the changes are entirely motor. I have seen a case of hæmatomyelia mistaken for lead poisoning for want of complete examination of the patient. In a case of peripheral neuritis in which there are motor, sensory, and pigmentary changes the possibility of arsenic poisoning must be considered. Litigation hysteria is all too common in the lead worker. The manifestations include hysterical spasm of the hand and arm, weakness of various movements, including the flexors of the wrists and fingers, glove and stocking anæsthesia, complete hemi-anæsthesia, and hysterical aphonia. Such signs and symptoms are rarely alleviated until legal proceedings are completed.

STORAGE AND EXCRETION.—In order to understand the treatment of lead poisoning it is necessary to inquire into the physico-chemical behaviour of lead in the animal body. It is probably transported in the blood plasma as the insoluble tertiary phosphate in the highly dispersed or colloidal form. At different stages of intoxication its distribution within the body varies somewhat. When absorption is slow it migrates to the skeleton where about 95 per cent. is held without harm during the chronic stage of plumbism. However, if large quantities of lead are being absorbed or are being liberated from the bones, lead is distributed throughout the tissues and the percentage in the bones is reduced. Under these conditions acute symptoms of poisoning occur. It has been shown that the total amount of lead stored in the skeleton in lead workers varies from 0·2 to 0·8 gramme. This deposition of lead suggests a mechanism similar to that involved in the deposition of calcium phosphate. Repeated observations have shown that under conditions which favour storage of calcium in the body, the excretion of stored lead diminishes; and that when conditions are unfavourable for retention of calcium the excretion of stored lead increases. Experimental studies of the conditions favouring and hindering liberation of lead from the bones have contributed to the knowledge of the treatment of lead poisoning. In cats experimentally poisoned with lead, acute symptoms may develop during starvation and at necropsy lead is found distributed more generally through the body than is typical of the chronic condition. This suggests that during starvation acidosis sets lead free from the bones. The probable reason for the increased liberation of lead during acidosis is the conversion of the tertiary phosphate of lead into the secondary phosphate which is exactly one hundred times more soluble. Hence the ingestion of acid as a method of treatment probably serves to liberate lead from the skeletal stores by converting it into a more soluble salt.

TREATMENT.—The treatment of lead poisoning in industry is essentially preventive. Less than 200 cases were notified in 1934 as compared with more than 1,250 in 1899. In this country preventive measures are carried out with such great success that the majority of cases of lead poisoning are mild. It is unusual to-day to meet with a case either of severe colic or of extensive palsy.

Preventive treatment.—The necessary measures of dust suppression have been referred to repeatedly in the foregoing paragraphs. In addition to cleanliness in the workplaces, personal cleanliness is of the first importance. Cloak-rooms, washing-rooms, mess-rooms, baths, nail-brushes, towels, and soap must be provided. The hands should always be washed before eating and the work-people urged to take a warm bath frequently. The bringing of food or drinks into the work-rooms must be forbidden, and so also must smoking at work. Medical examination of the workers exposed must be carried out periodically. At present there is no biological test by which to select workmen immune to the toxic effects of lead. Since they have been found unduly susceptible, it is necessary to forbid the employment of all persons under eighteen years of age in the potteries and other lead trades. In the prevention of lead poisoning a diet of high calcium content plays its part. In lead works in this country it has for many years been customary to provide the workmen free of cost with a glass of milk each morning. This is empirical treatment of considerable merit, anticipating as it did by many years the discovery that a high calcium intake assists the storage of lead in a harmless form in the bones. Workers should, in addition, take aperients regularly. Any worker who develops one of the toxic effects of lead has thereby proved his susceptibility, and ideally he should never again work in any department of a lead works.

Curative treatment.—Repeated observation has shown that with a high calcium diet lead excretion tends to diminish rapidly. This provides a means for controlling the storage of lead in the organism. To store lead in the bones so that it will not be free in the circulation to cause damage, it is only necessary to give a diet containing much calcium in the form of milk or calcium lactate. This produces a positive calcium balance which favours the storage of lead as a harmless deposit in the bones. In cases of lead poisoning showing toxic symptoms the diet should contain three pints of milk daily, including milk puddings, junket and ice-cream, together with butter, cheese and eggs. In the presence of acute symptoms it is important not to attempt elimination of lead, because so much is already circulating that it is safer temporarily to favour further storage. The first step should then be to prescribe large quantities of calcium lactate, five grammes (75 grains) three times a day. When the calcium intake is sufficient most of the lead is stored in the bones, and the patient presents no symptoms.

Lead colic.—If colic appears it is necessary to use local application of heat, pressure, and moisture. It is desirable that the bowels should be moved as early as possible by means of enemas of olive oil and warm water, and by the internal administration of magnesium sulphate along with belladonna and carminatives. In their studies of untreated lead colic writers of a hundred years ago found that it might persist for four to twelve or more days. They stated that colic usually yielded to treatment within eight days, but that if neglected, it might continue for two, five, or even six weeks. It is now a common experience that treatment by a high calcium diet usually brings relief within two days. The relief of lead colic by calcium therapy involves more than the mere tendency of calcium to favour storage of lead. There is evidently an anti-spasmodic action on involuntary muscle as well. The pain of lead colic is probably due to a contraction of the tonic ring in the intestine with marked peristalsis approaching this. A high calcium diet and the use of large doses of calcium lactate usually bring relief. In severe cases by the slow intravenous injection of 15 c.cm. of a 20 per cent. solution of calcium gluconate, or of 10 c.cm. of a 5 per cent. solution of calcium chloride, it is possible to relieve the pain by the time the injection is over. The patient feels hot and flushed, and may vomit. The effect upon the pain is striking and is superior to that of any other treatment. If necessary the injection may be repeated in two hours. Should such treatment not be available a hypodermic injection of 1/60 grain atropine sulphate may be given.

Lead palsy.—During the development of lead palsy, a high calcium diet should be used to favour storage of lead. Massage, electrical treatment, and strychnine are useful. In the early stages the hands, when affected by wrist-drop, should be supported on splints. The paralysed muscles may be stimulated by an induction coil, with or without a water bath, but over-stimulation must be avoided since it induces fatigue and so does harm.

Encephalopathy.—In this country the Home Office regulations, by the control of dust and fumes, have abolished encephalopathy. In the few cases with which they have had to deal, workers in the United States have had good results with a high calcium diet. Of six definite cases three occurred before the treatment was in use, and these all died. The other three were given large quantities of milk and calcium lactate and all promptly recovered.

Elimination of lead.—A few weeks after the acute toxic episodes have passed, elimination of lead may be accelerated by a low calcium diet used together with potassium iodide, ammonium chloride, or phosphoric acid. A diet with a very low calcium content facilitates release of lead from the bones. In such a diet all milk, milk products, green vegetables, and eggs are omitted. It may contain meat, liver, chicken, potato, peas, rice, tomato, banana, apple, lemon, tea, coffee, sugar, honey, salt, and pepper. All bread must be prepared without milk. Butter fat must be substituted for butter. This is prepared by melting butter in hot water and skimming off the butter fat. In those places where the water supply is hard, vegetables should be cooked in distilled water and all drinks made up with it. Potassium iodide was first used in the treatment of lead poisoning in 1844, and has been employed by clinicians ever since. It is not as effective as treatment by acidosis, but has the advantage of ease of administration. The dose should be increased from five grains three times a day to fifteen grains three times a day. Its physiological effectiveness appears to diminish progressively after the first few days of treatment. Occasionally cases of latent lead poisoning occur, that is to say, cases in which symptoms have been precipitated by various forms of treatment long after exposure to lead has ceased. In one such case administration of potassium iodide was promptly followed by the appearance of a lead line and wrist-drop, although previously there had been no evidence of lead intoxication. Acidosis may be produced by the use of phosphoric acid but it is more satisfactory to give large doses of ammonium chloride. Chronic lead poisoning may be treated by the cautious administration of this substance in doses of one gramme (15 grains) given in a glass of water eight or ten times daily for three weeks at a time. Loss of appetite and headache signify the limit of tolerance to such treatment, and the dosage should be reduced if these symptoms appear.

Various observations, particularly on animals, indicate that it is useless to attempt elimination of all the lead stored in the body. As this would doubtless require several years it is probably desirable to eliminate only the most readily mobilized lead. In prolonged observations the results indicate that after a certain point elimination of lead becomes progressively more difficult. When this stage is reached it seems more practical to favour retention in the bones by maintenance of a positive calcium balance. Thus after three weeks' treatment by a low calcium diet and ammonium chloride, there should be a rest period of a week with normal diet and abundance of milk to correct the calcium deficiency. Treatment to accelerate elimination should then be re-instituted. Neither ammonium chloride nor potassium iodide should be used in the presence of nephritis or of toxic symptoms. Should any toxic episode appear during the use of ammonium chloride or potassium iodide, these drugs must be stopped and a high calcium diet at once used to favour the storage of lead.

It is necessary to emphasize the difference between the use of agents which assist excretion of lead and those assisting its storage. The acidosis method of lead elimination is so potent that its use during colic or any other toxic episode might prove fatal from the further mobilization of lead at a time when the reverse procedure is essential. It is scarcely necessary to add that such treatment should never be used as an excuse for negligence in enforcing all the known measures for the prevention of exposure and absorption.

OTHER POISONS

Under the Factory Act 1901 it is compulsory upon medical practitioners to notify to the Chief Inspector of Factories, Home Office, Whitehall, cases of carbon bisulphide, aniline and chronic benzene poisoning, and also cases of toxic jaundice. Acute poisoning by carbon monoxide, hydrogen sulphide, trichlorethylene, and benzene are so sudden as to be classed as accidents. As such they have to be reported by the employer to the Factory Inspectors.

COAL-TAR DERIVATIVES

The coal-tar derivatives are so numerous and complex that it is difficult for the toxicologist to keep pace with the chemists who produce them. The following compounds will be discussed: benzene, mononitrobenzene, dinitrobenzene, aniline, phenylenediamine and trinitrotoluene. It is sometimes possible to predict from the chemical composition of the simpler members of the group what their physiological action is likely to be. Addition of a nitro- or nitroso-group usually produces a more toxic compound, but it does not follow that toxicity will continue to increase as more nitro-groups are added. Thus 1–2–4 dinitrophenol is toxic, whereas trinitrophenol is practically harmless. The position of the substituent groups in the benzene ring has a great effect on the toxic action. Thus the toxic properties of 1–2–4 dinitrophenol are not shared by any of the other isomers. When a nitro-compound is reduced to an amine, as when nitrobenzene is reduced to aniline, or nitrotoluene to a toluidine, the toxic characteristics remain much the same, but the intensity of the action is lessened. Sulphonation renders a compound non-toxic; as soon as aniline is sulphonated it ceases to give trouble. The entrance of chlorine into an aromatic compound does not increase the toxicity as it does in the case of an aliphatic compound. In fact, chlorbenzene is less toxic than benzene.

Benzene.—Coal-tar benzene, or benzol, is obtained as a by-product from the distillation of tar in the manufacture of coal gas. It is the most interesting of the industrial solvents and, with the exception of tetrachlorethane, the most dangerous. It must not be confused with benzine, which is, unfortunately, pronounced in the same way. Benzine is derived from the distillation of petroleum and it is non-toxic. Acute benzene poisoning usually occurs as the result of the breakage of distilling apparatus or in the cleaning of tanks. The symptoms in slight cases are giddiness, and a stage of excitement, but in severe cases these symptoms may be followed by convulsions, coma, and death. Chronic benzene poisoning has always been very rare in this country. Benzene is a good solvent for rubber but in the rubber trade it is not necessary to use it for naphtha is equally efficient, and quite harmless. In quick-drying paints, varnishes and lacquers, toluene, which is harmless, must be substituted for benzene. All cellulose-spray manufacturers should on principle reject benzene as a solvent or thinner. In the few cases where a firm uses benzene as a solvent for rubber the Factory Department of the Home Office requires that the air in the room should undergo thirty changes per hour. The clinical picture is that of purpura hæmorrhagica with epistaxis, menorrhagia, and visceral and retinal hæmorrhages. Ulcers or gangrenous patches on the lips, fauces, and pharynx are common. A profound reduction in the red cells is characteristic, and the granular leucocytes may fall as low as 10 per cent. The bleeding time may be increased to half an hour, with a corresponding drop in the platelets. The changes in the blood may begin from two days to one month after the first exposure, according to the amount absorbed, and they may progress or even develop after exposure has ceased. The death rate is high and the results of treatment poor. All who have studied the subject are convinced that the use of benzene in industry must be ruthlessly suppressed except where the process used is entirely enclosed.

Mononitrobenzene is a liquid used in the manufacture of aniline. If splashed on the skin it is absorbed and the victim becomes cyanosed and even unconscious. The symptoms are due to the conversion of oxyhæmoglobin into methæmoglobin. The blood may be chocolate coloured, and sometimes it is possible to detect the bands of methæmoglobin spectroscopically.

Dinitrobenzene is used in the manufacture of dyes, and was the principal explosive used by the Germans in the War. It is a solid, and in consequence cases of poisoning develop slowly. In a mild case there is a sense of pressure in the head which increases to a violent throbbing headache with dizziness and dyspnœa. In more severe cases the face is deeply cyanosed, the lips, tongue, and ears are purple, and there is nausea, sometimes vomiting, abdominal pain, a staggering gait and extreme weakness.

Aniline is used in the dye industry and to a less extent in the manufacture of rubber. The symptoms of aniline poisoning are similar in all essentials to those of nitrobenzene poisoning. The convenient term *anilism* may be used to cover the clinical picture produced by most of the nitro- and amino-derivatives of benzene. Prevention of absorption through the skin is all important. When a victim has turned blue in the face and begun to stagger it is no use to take him to the fresh air. What is needed is to strip off his clothes and give him a bath. The occasional occurrence of new growths of the bladder among dye workers is well known. The substance responsible has not been identified, but it seems to be an amino- and not a nitro-compound.

Phenylenediamine is used for two similar purposes;

dyeing hair black and as a dye for furs. It is well known that it may cause dermatitis and sometimes asthma in susceptible persons. Its systemic effects are much rarer and have received less attention. Cases are known in which the proprietor of a hairdressing saloon has suffered from attacks of weakness and vomiting, sometimes followed by unconsciousness. Cyanosis characterizes the attack, the face, lips, tongue and gums being swollen and blue. In such a case avoidance of exposure to the dye may remove the attacks completely.

Trinitrotoluene.—During the War work was carried on under the greatest pressure in shell factories and by 1916 at least 25,000 people were employed in shell filling alone. The first symptoms of poisoning by trinitrotoluene were drowsiness, headache, nausea, loss of appetite, epigastric pain, vomiting and giddiness. On examination some degree of cyanosis of the lips was found. Dermatitis in the form of a diffuse erythema often occurred on the dorsal surfaces of the wrists and on the face and neck. If cyanosis occurred in one in ten of the workers, toxic jaundice probably affected one in five hundred. The mortality rate from toxic jaundice in all persons handling trinitrotoluene was about 0·05 per cent. The intensity of the jaundice varied, and it was sometimes accompanied by irregular fever. The prognosis was always uncertain, but grave symptoms of hepatic insufficiency sometimes appeared rapidly. The mortality rate for all cases was 25 per cent. Aplastic anæmia sometimes occurred among trinitrotoluene workers, but its incidence must have been small. Toxic jaundice and anæmia appeared to be separate and independent pathological states. Anæmia might occur without jaundice, and only about 17 per cent. of jaundiced cases developed anæmia. The skin was the main channel of absorption and the application of preventive measures was therefore most difficult. Alternation of employment, periodic medical examination, ventilation, and clean working conditions were the chief preventive measures. Success was not achieved until mechanical means were substituted for the hand filling of shells, combined with measures of cleanliness which were so precise as to prevent the contamination of the outside of the shells by trinitrotoluene.

CHLORINATED HYDROCARBONS

The rapid growth of the moulded plastics and cellulose lacquer industries has led to the extensive use of many new solvents most of which were little more than chemical curiosities twenty or even ten years ago. Amongst these are the chlorinated hydrocarbons which have flooded the market largely because the alkali industry requires an outlet for its by-product, chlorine. The various members of the group are useful as refrigerants, as degreasers of metals, cleansers of textiles, solvents for rubber, and thinners of cellulose lacquers. They are non-inflammable, non-combustible and non-explosive, but unfortunately they are far from harmless in their effects on the human body. The action of carbon tetrachloride has been extensively studied because of its use in hookworm therapy. Tetrachlorethane dramatically attracted attention in the War, and a mass poisoning from leaking refrigerators in Chicago has led to an increase in the knowledge of the action of methyl chloride. Trichlorethylene has been studied because of its extensive use in dry cleaning.

Methyl chloride.—It happens occasionally that persons engaged in repairing refrigerators are affected by methyl chloride. The symptoms are nausea, vomiting, giddiness, weakness of the extremities and blurring of vision. Suppression of urine, due to acute nephritis, occurs in about half the cases.

Carbon tetrachloride is used in industry as a solvent for fats and rubber, for dry cleaning, for cleaning oil from machinery, and under the name "pyrene" as a fire extinguisher. It may attack both liver and kidneys, but in the majority of clinical histories so far published the symptoms of renal injury overshadow those of hepatic injury. The early stages of the illness are characterized by persistent headache, nausea, vomiting, diarrhœa, and tenderness over the liver, but such symptoms are often followed by oliguria, suppression of urine and uræmia. The death rate is low and a patient with jaundice, suppression of urine and uræmic convulsions may recover completely. Deaths in industry from the anæsthetic effects of carbon tetrachloride are seldom encountered, though it is well known that they have occurred from the use of this substance as a dry shampoo for the hair. In the treatment of cases overcome in this way it is important that the patient should not be placed upon the floor of the room where the accident occurred, for the vapour is five times denser than air and therefore accumulates on the floor.

Tetrachlorethane is a very good solvent for cellulose acetate, the chief constituent of the waterproof coating for the wings of aeroplanes and of non-inflammable cinema films. Tetrachlorethane is the most dangerous of all the chlorinated hydrocarbons, being about four times as toxic as chloroform and nine times as toxic as carbon tetrachloride. The symptoms of poisoning are general malaise, loss of appetite, nausea, headache, and constipation. After indefinite symptoms of this kind lasting several days or even weeks, jaundice develops, and vomiting is then likely to become marked. In fatal cases necrosis of the liver is found in the form of acute red and yellow atrophy. In one case the liver weighed only 19 oz. Since July, 1917, no dope containing tetrachlorethane has been used in British aeroplane works. Even exhaust ventilation by fans which changed the air in the doping rooms thirty times an hour was found insufficient to prevent poisoning.

Trichlorethylene has been recommended as an ideal non-inflammable non-poisonous solvent, but experience shows that it is far from harmless. It has assumed an important place in the list of fat and rubber solvents, and it is used extensively in dry cleaning. It has a powerful narcotic effect, and death may occur after prolonged exposure to a large dose. Trichlorethylene may also attack the liver and give rise to toxic jaundice.

TOXIC GASES

Gases such as chlorine, ammonia and sulphur dioxide are potent irritant poisons. Since they are irrespirable workmen exposed to them fly for their lives so that fatalities are rare. Unfortunately, gases such as carbon monoxide and arseniuretted hydrogen are non-irritant, tasteless, odourless compounds. Here the victims may be overcome without even suspecting danger. It is important to bear in mind that though intrinsically one gaseous poison may be more toxic than another, a greater rate of volatility may make the less poisonous one the more dangerous. Marvellous rescues are frequently made by workmen, foremen, and managers. But courage is not enough unless combined with skill and linked up to training and practice. Workshops must be adequately ventilated. No person should be allowed to work single handed in a place where exposure is to be anticipated. In certain circumstances the worker must wear an apparatus consisting of an oro-nasal mask connected to a hose led out into uncontaminated air. Life-belts should be provided for rescue purposes, together with a reviving apparatus consisting of a cylinder containing a mixture of 97 per cent. oxygen and 3 per cent. carbon dioxide with the necessary valves, tubing, flexible bag, and mask. This apparatus should be in charge of not less than two persons adequately instructed in its use. At least once a month the equipment and the rubber parts especially should be examined by them. The workmen should be practised in rescue drill, including artificial respiration and the use of the appliances provided. The first and immediate consideration is the restoration of breathing, and oxygen-carbon dioxide must be administered whenever respiratory difficulty is apparent. Those responsible for rescue work should be especially warned of the danger of exposing a gassed person to cold and of walking him up and down. They must realize that rest and warmth are essential in treatment and that the patient must be wrapped in dry blankets and provided with hot water bottles.

Carbon monoxide.—Water gas, power gas, producer gas, and blast furnace gas may contain as much as 25 per cent. of carbon monoxide. This figure is of great importance since air containing more than one part per thousand entails danger to life. Carbon monoxide acts as a chemical asphyxiant owing to the property it possesses of combining with hæmoglobin 300 times more readily than does oxygen. The initial symptoms of poisoning include giddiness, a sense of oppression in the chest, and loss of power in the lower limbs, the patient falling to the ground unconscious.

Carbon dioxide.—Exposure to carbon dioxide may occur in fermenting vats in breweries, in mineral-water factories, wells, tanks, ships' holds, coke ovens, boilers, agricultural silos and at lime kilns. Air containing 8 per cent. of carbon dioxide becomes irrespirable, and causes death from asphyxia through deprivation of oxygen. The victim of carbon dioxide poisoning rapidly becomes unable to stand and passes into coma.

Arseniuretted hydrogen.—The majority of cases of poisoning by arseniuretted hydrogen are due to the use of acids and alloys or ores contaminated with arsenic. Among the occupations concerned are pickling and galvanizing metals, cleaning acid tanks, the manufacture of hydrogen and the making, charging, and using of accumulators. In mild cases there are nausea, headache, shivering, exhaustion, giddiness, and vomiting. In severe cases intravascular hæmolysis occurs and produces hæmoglobinuria within six hours. Within twenty-four hours there is jaundice, and by the third day anæmia in which the red cell count may fall below 1,000,000 per c.cm. The death rate is as high as 30 per cent.

Sulphuretted hydrogen (*hydrogen sulphide*) may give rise to poisoning when it is present to the extent of one part per thousand in the air breathed. It is given off in many industrial operations, the chief of which are the spinning of artificial silk manufactured by the viscose process, the cleaning of stills in tar works, the manufacture of ammonium sulphate and sodium sulphide, and work in sewers, sugar manufacture, tanyards and brewing. Inhalation of a large dose causes almost instantaneous death, the patient falling dead often without a sound as if struck with a blow. Inhalation of small doses may cause headache, nausea, depression, and conjunctivitis with lachrymation.

Nitrous fumes.—Exposure to nitrous fumes may occur in the manufacture of nitric acid, in the nitrating of explosives, in the dipping of brass or copper articles, and the accidental breaking of carboys. Nitrous fumes are reddish brown. They act on the bronchi and lungs. Unfortunately the effect is delayed so that the worker feels able to go on with his work for three or four hours, when dyspnœa appears owing to œdema of the lungs. This in itself may be fatal, or it may be followed by broncho-pneumonia.

Chlorine.—Poisoning by chlorine may occur in the manufacture of alkali and bleaching powder, in the bleaching of flour, in dye works and paper mills, and in the breaking up of cylinders supposed to be empty. Chlorine in the air breathed to the extent of only one part per hundred thousand is highly injurious to man, causing cough, dyspnœa, and bronchitis. If excessive quantities are breathed there is great respiratory distress and rapid death.

Phosgene owes its poisonous action to the fact that it decomposes readily in the presence of water to hydrochloric acid and carbon dioxide. This decomposition takes place within the body when the gas reaches the bronchioles and the alveoli of the lungs where it is acted upon by the water vapour. Phosgene therefore does not produce its effect until it has penetrated deeply into the lungs, and because it does not produce any local irritation the victim has no warning of the fact that he is breathing a deadly gas. Pulmonary œdema follows, and either this is quickly fatal or broncho-pneumonia supervenes.

Sulphur dioxide.—Risk of poisoning from sulphur dioxide exists in the neighbourhood of furnaces and boiler fires, in chemical and dye works, in the manufacture of sulphuric acid, and in bleaching and fumigating. Sulphur dioxide is irritating to the eyes and respiratory tract. In fatal cases there is great respiratory distress and death occurs from exudation into the bronchi and lungs.

Ammonia.—Accidents with ammonia may occur in leakage from refrigerator plants, in the manufacture of ammonium sulphate, in spilling of ammonia liquid, and in breaking up cylinders supposed to be empty. Ammonia is an irrespirable irritant gas. Inhalation of large amounts causes sneezing, lachrymation, a burning feeling in the pharynx and embarrassment of respiration from œdema of the upper respiratory passages.

Carbon bisulphide is a valuable solvent of grease, fat, and oil. It is widely used in the vulcanization of rubber and in the manufacture of artificial silk. It is a colourless, volatile liquid, with a nauseating odour. It causes symptoms when it exists in proportions greater than four parts per 10,000 of air. These symptoms are violent headache, giddiness, and vomiting, with pains and tinglings in the limbs. Restlessness, excitement, and acute mania next occur and are succeeded by deep depression, with loss of memory, mental dullness, and blurred speech. Poisoning is hardly ever fatal, and complete recovery in the slighter cases is invariable. In very few victims does the mental depression persist permanently.

INDUSTRIAL DISEASES OF THE LUNGS

WITH SPECIAL REFERENCE TO SILICOSIS

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THE legend is intimately connected with the needs of man and the progress of civilizations. The beginnings may be gathered from the flint mines and flint chippings left by neolithic man on the Sussex downs and scattered places on the continent, the urns turned on the potters' wheel at Ur (circa, B.C. 3500) and the asbestos mines of the Ural mountains from which cremation cloths were woven (Herodotus, B.C. 450) and the wicks of the lamps of the vestal virgins made. As the demand for coal, iron, tin, lead, silver, copper, gold and granite increased, the harmful effects of dust were noticed and repeated references made to it from the time of Hippocrates. Pliney the Elder (A.D. 77) mentions the first protective measure. "Minium (red oxide of lead) refiners in the factory envelop their faces with loose bladders which enable them to see without inhaling the fatal dust."

The results of the inhalation of mine, quarry and factory dusts have been increasingly emphasized from these early days to the time of Ramazzini in the eighteenth and Thackrah at the beginning of the nineteenth century but the statistical study of morbidity and mortality rates in various trade-processes and the systematic X-ray investigation of workers may be said to date only from 1900, the beginning of the era of intense industrial activity. The study of industrial disease of the lungs is then still in its infancy, and although much work has been, and is, being done, many unsolved problems remain.

HARMFUL DUSTS

The lungs may be the path of absorption of various poisons and metallic dusts which, as far as present knowledge goes, do not leave any permanent injury to the lung tissue. The dust and fumes of arsenic, lead, mercury, brass, zinc and manganese, the fumes of benzene, tetrachlorethane, CO, nitrous fumes, phosgene, trichlorethylene and carbon tetrachloride are common examples. The dust may have carcinogenic properties such as the chromates, or carcinoma of the lung may be a complication of silicosis or asbestosis. The dusts of wood, tobacco, bone, fur, feathers, hair, jute, hemp, flax, flour and grain may give rise to congestive conditions in the upper respiratory passages and lungs and in some cases, as cotton dust, lead to asthma, emphysema and chronic bronchitis. The dust may be infective and give rise to lung disease as the pulmonary anthrax of woolsorters, and glands and the actinomyces and other mycotic diseases of the lungs recently described in agricultural workers.

All the above are occupational risks, but the number of workers in these trades is small compared with the numbers in the dusty processes in coal, gold, tin, lead, and other metalliferous mines, tunnelling, stone dressing, quarrying, cement works, potteries, slate, gypsum and marble works, and the quarrying and manufacturing processes in the asbestos industry, and the term " industrial diseases of the lungs " by common usage denotes the pneumoconioses caused by inorganic mineral dust.

A dust to be harmful must be capable of producing a reaction in the lung, must be in a sufficiently fine state, and must be inhaled in sufficient quantities over a sufficient period of time. Of all the dusts generated during mining, quarrying, and manufacturing processes only two, up to the present time, have been proved to be biologically active, and to cause extensive disease in workers. They are free silica dust (SiO_2) and asbestos dust. Free silica occurs in the crystalline state as quartz, flint, chert and agate and in the amorphous state as opal and diatomaceous earth. Asbestos is a magnesium silicate and in addition to its unique physical characters is a chemical curiosity. Weak acids such as acetic dissolve out the bases Mg and Ca leaving the fibre pure silica unaffected in appearance and physical properties. Possibly the action of the lung juices is similar, the fibrosing agent in asbestosis being actually free silica.

Many other dusts have been suspected—coal, cement, slate, marble, gypsum, phosphate, french chalk, china clay, guano—but none alone have been proved to produce serious fibrosis of the lungs. To produce the disease there must be an admixture of silica. The claim has also been made that sericite and not free silica is the cause of silicosis. Sericite is secondary white mica, a hydrated silicate of potassium and aluminium, occurring in minute acicular form. The case against this is that silicosis is frequent in occupations such as flint grinding in which sericite is not present in the dust and experimentally it has not been found possible to produce silicosis or pulmonary fibrosis in rabbits with sericite dust although controls dusted with pure silica readily contracted the disease. There are other arguments against and it is generally accepted that sericite is not the primary cause of silicosis.

Siderosis and anthracosis are terms given respectively to the red solid lungs of ironstone miners and the hard black lungs of coal miners. The colouring is due in the one to iron oxide, and in the other to coal dust, but in each case the workers have been employed in silica rock and the diseases are fundamentally silicosis. The best example to illustrate this is to be found in the coal-fields of Britain. In the northern coal-fields much of the roof and floor of the mines consists of mud-stone and shale which contain abundance of secondary white mica, but little free silica. The incidence of silicosis is extremely small and falls solely on those engaged in drilling and handling sandstone. In the South Wales mines—the anthracite mines—quartzite rock containing 60 or 70 per cent. of silica is daily encountered and silicosis is much more common, as the following figures taken from Middleton's Milroy lectures show :—

SILICOSIS IN COAL MINES

DISTRICT	NO. OF WAGE EARNERS ON DEC. 14, 1935	NO. OF CERTIFICATES ISSUED		SUSPENSIONS*
		Deaths	Total Disablement	
England, Scotland and North Wales	624,608	22	67	35
South Wales	130,552	147	511	198

* The suspension certificate is issued to early cases of silicosis.

The figures are for the period of 4½ years from June 1, 1931 to December 31, 1935.

Again, in the Penrhyn slate quarry workers silicosis was common among the mill-men, 50 per cent. of whom were affected. The slate contains up to 42 per cent. of silica. In a slate quarry in France the whole of the workers were examined radiologically and clinically. Not a single case of silicosis was detected. The slate contained a large percentage of complex silicates including sericite, but only 6 per cent. of silica.

PHYSIOLOGICAL DEFENCE AGAINST DUST

The respiratory tract from the nose to the alveoli is lined by ciliated columnar epithelium and bathed in mucus. The wave-like motion of the cilia is upwards towards the larynx. Dust-laden air entering the alæ nasi comes in contact at once with the large surface of the turbinate bones and septum, and strikes the posterior wall at right angles to be deflected towards the laryngeal opening. It is estimated that 60 per cent. of the dust particles are trapped before reaching the larynx. The whirling air enters the larynx and bronchi and a glance at the bronchial tree with its innumerable angles and divisions will demonstrate the very efficient protection afforded the delicate alveoli from dust particles. If dust does enter the alveoli it is taken up by the phagocytic dust cells which wander back to the bronchiole and are expelled in the sputum, or the dust cell may traverse the alveolar wall and enter a peribronchial or perivascular lymphatic vessel and eventually be deposited in the sub-pleural region or in the tracheo-bronchial glands.

Particle size.—Over 90 per cent. of mineral particles found in lungs are less than 5 μ in diameter, the majority being 0·1 to 3 μ and it is the practice in dust counting to disregard all particles over 10 μ. The protective mechanism is very efficient unless constantly overwhelmed over a long period by the presence of particles in the air less than 10 μ in length. To define a "safe" limit of atmospheric dust would be extremely dangerous but thorough investigation of the workers in the Barre granite industry in America shows that those exposed for years to atmospheres containing not more than 10 to 20 million particles per cubic foot escape, whereas those breathing higher concentrations eventually develop silicosis. Barre granite contains 35 per cent. of silica.

Duration of exposure.—Some idea of the length of time required for silicosis and asbestosis to develop may be gathered from the following table taken from the report of the chief Medical Inspector of Factories.

The number of deaths are totals of several years.

INDUSTRY	Number of deaths	Average age at death	Duration of employment in years		
			Longest	Shortest	Average
Pottery:					
Silicosis - - - - -	159	58	62·0	2·8	39·2
Silicosis with tuberculosis	164	54·1	67·0	5·0	36·4
Sandstone:					
Silicosis - - - - -	78	58·1	57·0	9·0	38·3
Silicosis with tuberculosis	88	53·9	53·0	10·0	35·3
Grinding of Metals:					
Silicosis - - - - -	26	56·1	56·0	18·0	34·3
Silicosis with tuberculosis	73	52·1	52·0	2·8	31·5
Sand-blasting:					
Silicosis - - - - -	15	44·5	20·0	4·0	10·7
Silicosis with tuberculosis	36	44·4	20·0	2·52	8·4
Manufacture of scouring powders:					
Silicosis - - - - -	8	34·70	37·0	2·3	9·2
Silicosis with tuberculosis	2	33·5	10·8	2·0	6·4
Asbestosis - - - -	52	41·9	27·0	1·5	12·4
Asbestosis with tuberculosis - - - -	30	37·1	29·0	0·8	9·5

Excessive amounts of dust lead to more rapid development of silicosis as in sand-blasters and the presence of free alkali as in certain scouring powders accelerates the action of silica.

Individual susceptibility.—Apparently all persons subjected to the same amount of dust over the same period of time do not develop silicosis. The factors governing individual susceptibility are not understood but certain conditions seem to accelerate the onset. Females seem to contract the disease more rapidly than males, and men commencing work in silica dust when over forty years of age show signs of silicosis after shorter exposure than those starting at an earlier age. The languid, and phthinoid-chested, and those with old healed tuberculosis or a positive Wassermann, chronic bronchitis, or who have had repeated attacks of pneumonia contract the disease early, and mouth breathing whether due to chronic naso-pharyngeal disease or not is said to accelerate the onset.

The action of silica.—To produce a reaction either in subcutaneous tissue or the lungs a dust must be soluble. Silica is soluble to the extent of 1 in 10,000 parts of distilled water, and the solubility is increased by the presence of alkalis, and increased too as the size of the particle diminishes. If 0·2 c.cm. of a 2 per cent. suspension of pure quartz particles less than 3 μ in diameter be injected into the skin of a guinea-pig an acute inflammatory reaction takes place which later leads to necrosis and sloughing and the production of a zone of hyaline fibrous tissue around the area. The action of the silica suspension is so rapid that it is difficult to believe that solubility is the only factor in the production of the effects. Powdered quartz is more active electro-chemically than silica hydrosol and the rapid cellular response may be due to the ability of the negatively charged silica particles to coagulate a positive colloid in the cells. Other dusts such as diamond, carborundum, emery, coal and iron produce only an area of pigmentation in the centre of a zone of erythema.

The characteristic reaction to silica in the lung is the production of nodules of hyaline fibrous tissue. Particles entering the alveoli are taken up by phagocytes which pass along the lymphatics to the tracheo-bronchial glands at the hilum. Many are retained in the perivascular and peribronchial lymphoid tissue. Wherever the silica-laden cells are arrested an inflammatory reaction is set up and results later in the production of a fibrous nodule. The walls of the blood vessels or bronchi appear thickened and the hypertrophied and fibrosed lymph nodes present a beaded appearance. There is frequently thickening of the inter-alveolar septa. Nodules form in the parenchyma of the lung due to accumulations of silica which cannot be eliminated owing to blocking of the lymphatics.

Silicosis and infections.—At least 75 per cent. of patients with silicosis contract tuberculosis. The silicotic lung is susceptible to infection and this susceptibility increases with the amount of damage produced by silica. Other infections are not uncommon. Influenza, bronchitis, and pneumonia account for 6 per cent. of the deaths of those certified as silicosis in South Africa. Cummings discovered that fuso-spirochœtal infection of the silicotic lung was frequent in Oklahoma. The chronic bronchitis associated with silicosis favours the aspiration of mouth organisms and pneumonic reactions occur. The patients improve clinically when treated by intravenous injections of neoarsphenamine with a disappearance of massive shadows seen by X-rays.

X-ray appearances.—The earliest manifestation is an increase in the density of the shadows of the vascular tree. The larger branches appear thicker and heavier and the terminal branches can be followed almost to the pleural surface. As the disease progresses, the smaller arteries appear to have buds along their course. The parenchyma of the lung looks hazy, and nodules appear. Later with coalescence of nodules massive conglomerate shadows may be seen. The earliest indications are in the mid- and lower-lung zones. Increase in the root shadow due to involvement of the glands is constant.

SYMPTOMATOLOGY

Increasing dyspnœa on exertion, hardly noticeable at first, becomes more and more apparent as nodulation and massive fibrosis and emphysema develop, until in the last stages the dyspnœa is static. The working capacity is impaired, but miners with apparently advanced disease, as shown by X-rays, carry on their occupation without distress. Bronchitis is frequently associated with silicosis and results in a cough which may be severe. The disease is apyrexial. When silicosis becomes complicated with tuberculosis there may be a long period from the time progressive tuberculosis can be diagnosed by X-rays and the appearance of clinical signs of the disease. Loss of weight, fever, night sweats, hæmoptysis and more abundant sputum are noticeable. Tubercle bacilli are often difficult to detect in the sputum and many examinations, and even guinea-pig inoculation, may be necessary. The blood sedimentation rate is useful to differentiate between simple silicosis and silicosis with tuberculosis. Pain in the chest due to pleural involvement is not uncommon and anginal attacks on exertion are frequent in the later stages.

Physical signs do not bear any relationship to the extent of lung involvement. The respiratory murmur in the early case is diminished in intensity and may be of higher pitch than normal. In the advanced case compensatory emphysema is constant and gives the usual signs—diminished chest expansion, barrel-shaped chest, obliteration of cardiac and liver dulness, and a tympanitic percussion note. The response to effort is poor and is an index to the extent of physical incapacitation. With massive consolidation there is dulness over the areas with diminished or absent breath sounds, or there may be bronchial breathing depending on the relationship of the mass to a large bronchus. Pleural effusion and spontaneous pneumothorax may occur.

DIAGNOSIS

The diagnosis is based on a working history of exposure to silica dust in a sufficient quantity and over a sufficiently long period, and a good X-ray film. A complete working history and a knowledge of the various industrial processes is essential. The physical signs and symptoms are not characteristic of silicosis. The presence of dyspnœa on moderate exertion, pain in the chest and an irritating cough with definite loss of capacity for physical work together with the appearance of " budding " or nodulation of the bronchial tree render the diagnosis definite.

TREATMENT

The nodules of fibrous tissue and damaged lymphatics are permanent and the fibrosis once established is progressive to a certain extent. When diagnosed the silicotic should be removed from any silica hazard and protected as far as possible from the risks of infections, especially tuberculosis. The real treatment lies in prevention of dust formation at its source. The methods are numerous but, briefly, consist of water and foam drilling, wet grinding, the trapping of dust and exhaust ventilation. Where it is impossible to check the production of dust there should be adequate ventilation and the workers should wear masks or helmets. Workers should be examined by X-rays and clinically before being employed in an industry with a silica risk, and periodically examined during the term of employment. The tuberculous, undersized, phthinoid-chested and mouth-breathers should be excluded. The worker with open tuberculosis is a danger to himself and his co-workers if allowed to work in silica dust, and should be treated in an institution.

PSYCHOLOGICAL DISORDERS IN INDUSTRY

By MILLAIS CULPIN, M.D., F.R.C.S.

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THIS title covers a larger field than appears at first sight, for sickness insurance figures and records kept by individual establishments are revealing that an important proportion of sickness absence is caused by psychoneurotic, that is, psychological, disorders. The number of days lost per head per annum varies from 3·7 days to 11·4 days per man, and from 4·0 days to 18·3 days per woman; when the sexes could not be differentiated the range is from 3·3 days to 9·2 days. If absences of thirty days or more are compared the variability is often even greater. When the diagnoses are studied there is found in some organizations an excess of those conditions called nervous breakdown, nervous exhaustion, debility and such like, and a high absenteeism is generally associated with this excess. Halliday's work in Edinburgh showed that even in the sickness of insured persons there exists a thirty per cent. incidence of psychoneurotic disorders when the cases are carefully investigated. In this last example the incidence could not be discovered by an examination of the accepted diagnoses, but only by an investigation of the actual cases. That is to say, the psychoneuroses were often concealed under other diagnoses.

This phenomenon is soon recognized by an examination of classified diagnoses. There is often an inverse correlation, for example, between gastric diagnoses and those of the nervous group, the one diminishing as the other increases, and I have known one instance in which the medical officer of a large firm unwittingly demonstrated a *modus operandi* of this correlation. He had become concerned at the excessive absence through nervous disorders and took the trouble to inquire into each case when the patient returned to work. He assures me that his inquiries were not in any sense hostile, but the result was a notable decrease in the incidence of those disorders. His total figures were, however, unaffected, and further statistical examination revealed that the groups under the diagnosis of " gastric " and anæmia had grown at the expense of the nervous group. Those readers familiar with the difficulties of panel practice can perhaps imagine what took place between the patient and the practitioner when the time came for a certificate to be given, and how this curious result came about. As long as the practitioner is compelled to give a definite diagnosis to every case, so long will sickness figures be unreliable; there should be provision for a formula like the army " N.Y.D.," with the addition of some non-definitive symptom. Neuritis had such a vogue a few years ago that, as a check upon its apparent prevalence, I obtained figures from the receiving room of a London hospital of the diagnoses in 1,000 cases—excluding children and accidents—referred to the out-patient department. There were a few cases of sciatica and only one marked " query neuritis," yet at that time neuritis was a common cause of disability in the world of industrial sickness. It has diminished since then, but there is little doubt that the cases have only been transferred to some other group.

There is clinical ground for the interchange between gastric and nervous diagnoses. Gastric disturbance is such a common result of emotional stress or upset that it offers an easy escape from a recognition of the primary cause. Moreover, recent work is showing an intimate relation between gastric disorders and the occurrence of emotional stress acting upon people of a particular temperamental make-up. Without denying the influence of dietetic errors and other recognized causes of gastric troubles, it is certain that the curious variations in the incidence of industrial gastric disorders are not to be attributed entirely to such causes. May Smith and Margaret Leiper,[4] in their recent investigation of sickness absence find that, after respiratory diseases and accidents, gastric and nervous disorders are an important cause of sickness absence. In an earlier report[3] it is noted that the nervous person is liable to have more sickness absence than others, though not necessarily in the form of nervous breakdown.

It is not easy to give a fair estimate of the distribution of nervous disorders according to occupation. One establishment may allow long absences for such causes and still retain the employee to swell the total sickness rate, whilst in another occupation he would disappear from the records. Yet there are some obvious differences in incidence, the discussion of which would involve a consideration of psychopathology and of sociology that is beyond the scope of this paper. Why, for instance, are there few or no nervous breakdowns among laundry workers, and an excess among schoolteachers ? It is not because there are initial differences in the temperaments of the members of the two groups, for I find as many nervous subjects in laundry workers as in the students of a training college. Nor is the method of payment a deciding factor, obvious though it may seem at first sight.

SYMPTOMS AND DISABILITY

My work under the Industrial Health Research Board has enforced the distinction between nervous *symptoms* and nervous *disability*. Here is an example of severe symptoms in a woman whose work was satisfactory, who had no absences from sickness, and whose employer had no suspicion of her troubles :—

Laundry worker, female, aged 34, is married and has four children. She likes the work very much; would not change it if given the chance. " My nerves are all bad. The least worry makes me go all of a shake. I worry at the least thing. I'm afraid in the dark or of being alone. Wouldn't go along a dark road." She describes claustrophobia. " Should worry and fidget in this room. Never go in a bus; wouldn't go alone in a train; feeling of being observed; never go out by myself." She has to find a companion to accompany her to work. A summons to see her manager would make her go all hot. " All of us have been born with nervous debility." She never goes to the pictures and is asocial. She has a yielding grip which she ascribes to rheumatism.

Favourable points in her environment were :—

1. Her work, ironing, was within her own judgment. She knew when it was well done and was independent of criticism from her superiors. Moreover, the results were immediate and visible.
2. The trade was flourishing. If dissatisfied with her employers or employment she could easily find work elsewhere.
3. There was a cheerful and friendly spirit in this particular laundry.
4. Her social needs and outlook were satisfied, within the limits of her psychoneurosis.

If these conditions are compared with those that may be present in the environment of a school teacher, it is easy to understand that symptoms of much less severity would, in the latter case, inevitably call for a nervous breakdown.

As will be seen, there is a reservoir of people with nervous symptoms in all occupational and social groups. Upon these, it is legitimate to suppose, falls most of the incidence of disability from nervous disorders, but the cause of an excess of absenteeism among this group is to be sought in occupational conditions. What these are is a matter for study in each case, but when an excess is found in a vocation, such as school teaching, in which there is security of tenure and payment during illness, it must not be hurriedly assumed that these conditions are the cause. With security of tenure goes a rigidity of working conditions, which may be intolerable to some psychoneurotics. When working conditions are unsatisfactory but there is no security of tenure the expected result would be excess, not of illness, but of labour wastage, which may well be as expensive to the organization concerned.

THE INCIDENCE OF NERVOUS SYMPTOMS APART FROM DISABILITY

I have had the opportunity of examining more than 1,500 people actually at work, with the aim of estimating the prevalence of psychoneurotic symptoms or temperamental difficulties.[3] Taking as a standard of severity the state of people who reach the practitioner's consulting room in the search of relief, I find that from 5 to 7 per cent. of the working population suffer to that extent. About 20 per cent. have lesser symptoms sufficient to interfere with happiness or efficiency, another 20 present an odd symptom or so that does not affect them, whilst from 40 to 50 per cent. reveal no symptoms on the superficial examination limited by the necessities of the investigation. There was no appreciable difference in distribution of symptoms according to sex, age mattered little—all the subjects were of working age—and there were only occasional differences in occupational groups. Scientific workers and art students gave an excess of high assessments, often with a predominance of obsessional symptoms. One interesting group of clerical workers had been selected by efficient though rule-of-thumb methods designed to exclude people judged likely to break down; the result was the exclusion of people with hysterical or anxiety tendencies but the admission of those with obsessional traits. The establishment undoubtedly profited by this selection, for the mildly obsessional subject may be an excellent worker, often justifying the belief that the best work of the world is done by nervous people.

The investigation did not include any group of men occupied in heavy work, but chance observations suggest that the incidence of symptoms would be little different among those. Among ten physically picked men, for example, I found three with symptoms sufficient to warrant the expectation of a breakdown under stress; and a small group of transport drivers presented a typical symptomatology.

THE OCCUPATIONAL NEUROSES

It is difficult to get away from the anatomical conceptions underlying the word *neurosis.* Especially in such conditions as writers' or telegraphists' cramp is it easy to picture an interference with the motor function of nerves which will, in theory at least, account for the symptoms. The modern view, however, is that such disorders are psychological manifestations, that a writers' cramp may be regarded as a stammer of the hand—something that the patient is doing, unwittingly and unwillingly, as a result of unconscious mental processes and not as a consequence of disorder of nerve. A sufferer from telegraphists' cramp provided an excellent example of the analogy of that disease with stammer when he handled the Morse key with ease and tapped off messages without difficulty when the key was connected with a tambour to record the pressure he had used, but explained that he could do that all right because he wasn't sending a message. He was like a stammerer who could speak easily so long as no one was listening. Another analogy is the specific difficulty experienced with certain letters, one man finding difficulty with C, K, and Q—a combination obviously dependent upon the sound of the letters and not upon dots and dashes.

When sufferers from these troubles are examined for the presence of psychoneurotic symptoms it becomes plain that most of them are in serious difficulties apart from the cramp. There is no specific condition associated with the disorder, and a series of cramp cases will present a mixture of hysterias with anxiety and obsessional states, such as are met in any collection of psychoneurotic patients. A few, indeed, might deceive the investigator by the total absence of symptoms if he were not experienced enough to recognize as a hysterical stigma the excessive protestations of perfect health, the *belle indifférence de l'hystérique* of Charcot.

Writers' cramp should always be carefully investigated for anomalous symptoms expressed in the cramp itself. Difficulty with particular letters, with the signature, with writing when under observation, with the use of a pen and not of a pencil, may suggest points of attack for therapeutic investigations or analysis. In making a diagnosis of psychological disorder, whether cramp or anything else, it is necessary to be free from the moral condemnation embodied in the word *neurotic*, and to recognize that neither high intelligence nor probity can protect anyone from these disabilities. To exclude a psychological possibility because the patient is " not that sort of man " is a common diagnostic error.

Writers' cramp is often overlooked. It may be called "neuritis" or regarded as belonging to the tremors of an anxiety state. If, reversing the procedure of seeking for other symptoms in the cramp subject, specific symptoms are sought for in nervous subjects, then minor degrees of the occupational disorders are often discovered.

The treatment of an established case is so difficult—I have only known a cure after prolonged analysis, undertaken for other disabling symptoms—that early attention to its appearance is desirable. Although an established cramp draws to itself a mass of unconscious symbolism, becomes " over-determined " in the technical phrase, yet its onset may be brought about by some current stress or difficulty, the removal of which may arrest its development.

Telegraphists' cramp has, I believe, almost disappeared with the discarding of the Morse key. The typewriter does not lend itself readily to the development of cramp, but cases do occur. A printers' cramp was described by Ramazzini in the eighteenth century but I have not heard of its existence now.

The most important occupational neurosis of to-day is miners' nystagmus, which costs about £600,000 per annum in compensation and is a continual source of discussion and legal argument. It is called a neurosis, and the old influence of the word seems to prevent realization of its psychological aspect, of which I will give a brief and perhaps dogmatic account. Regarded primarily as an ocular disorder it is identical with other psychoneurotic manifestations and its association with oscillation of the eyeballs has obscured understanding. In safety-lamp pits a large number of men, varying, according to different observers, from 15 to 41 per cent., show oscillation and make no complaint of symptoms. Some of these men, rarely more than 2 per cent. of the total employed, begin to complain of subjective movement of objects with resultant giddiness and headache. Why this very small proportion should suffer is a question unanswered by ophthalmologists, but the symptoms are accepted and the miner goes on compensation. Sometimes he recovers and goes back to work. Often the oscillation diminishes or ceases altogether, but the man claims to be still incapacitated and the presence of a disability becomes a matter of dispute.

The situation can be understood by reference to the other occupational neuroses in which, as has been said, the picture comprises the whole range of psychoneurotic disabilities as they are commonly seen, independently of the eponymous symptom. But, since the eponymous symptom is itself disabling, the other symptoms have been disregarded till the psychopathologist came along and insisted upon recognizing them. So long as a telegraphist had cramp he received compensation, whether his other symptoms mattered to him or not. But in the miner the oscillation itself was not disabling, although its presence was necessary for compensation; he was really disabled by psychoneurotic symptoms, the most conspicuous of which could comfortably be attributed to the oscillation whilst the others remained uninvestigated.

In an examination of 36 miners receiving compensation I found just the same collection of symptoms that are found in any group of psychoneurotic patients: hysterias, severe anxiety states, and at least two advanced obsessional conditions. These symptoms were, in their severity, inversely proportional to the degree of oscillation, the most severe cases showing none that I could detect.[2]

Thus there is a large proportion of miners showing oscillation without any symptoms and a very small proportion showing severe symptoms with slight or no oscillation. It is plain that the attempt to assess disability in terms of oscillation is responsible for the endless argument and disputes that mark this subject. The conflicts of the present situation result from past mistakes and are difficult of solution. I am not in favour of the creation of a "miners' neurosis," to be dealt with by compensation, for to pay a man for a psychoneurotic disability without giving him efficient treatment is to push him along the downward path to complete and lasting invalidity.

COMPENSATION NEUROSES

The general principles necessary to the understanding of the occupational neuroses are applicable here. A dozen cases of "traumatic neurasthenia"[1] included a few hopeless wrecks who had given up all hope of standing alone, a few decent citizens with unrecognized anxiety states who, in the absence of informed handling and treatment, were compelled to cling to compensation by fair means or foul, one case of recent onset (an hour or two of skilled psychotherapy would have put the man on his feet again), and an interesting " strained back " whose complaints of physical disability were frankly cast aside when he found that I was willing to listen to the pathological fears that prevented him from working and had never been elicited by his previous examiners. In only one case did I diagnose malingering. It has been often stated without contradiction that these compensation cases always clear up when finally settled, but I know that this is not correct. Some of them are clinically identical with cases in which the patient derives no monetary or other material benefit from his disability and is freely co-operative in treatment and grateful for recovery.

CONCLUSION

I have purposely said very little about treatment. Clinical psychology is a neglected subject and I have had to confine myself to general principles, for the enumeration and description of symptoms, a knowledge of which is obviously a necessary preliminary to treatment, cannot be undertaken in a short article like this. There will be a better handling of these clinical problems when psychology becomes part of the student's curriculum.

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SOME PRACTICAL ASPECTS OF INDUSTRIAL HYGIENE

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UNTIL recent years industry itself has not employed medical men, except in rare instances, to advise on measures relating to the health of the worker. Nowadays, however, the medical profession is helping industry in many ways regarding many practical aspects of hygiene and health of the community as a whole and the individual. It is impossible to lay down definite rules of guidance either for the industrial medical officer or his management in connection with problems of health. Each industry and particular environment has essentially its own peculiar problems. There are, however, certain broad principles which can be taken as a basis for the introduction of measures relating to hygiene in the factory.

The medical officer in industry has a difficult but all-important job to establish himself as an integral part of the community in which he works. His department, in addition to catering for the physical and mental needs of the individual at work, becomes in due course a technical or advisory department, comparable to that of engineers or research workers. It takes time for the medical practitioner to become acclimatized to his new environment and to develop reasonable experience of industry's requirements, but it is a matter of peculiar interest that industry itself is demanding more and more the whole-time services of the medical profession. It does not do this for purely humanitarian reasons. The modern employer is beginning to recognize the economic value of a well-organized medical department; and even the smaller industrial concerns in this country are now tending to engage the services of a medical officer on a part-time basis.

Before any ideal state of affairs can be attained much work has to be done in the field, and in particular, on the practical side of what for want of a better term is called industrial hygiene. Those who work in the laboratory and are engaged on the academic side of medicine often do not fully appreciate the great importance and difficulty of work in the factory itself. The man in general or hospital practice has literally not got the time to make a study of industry. It is left therefore to the medical practitioners actually within industry to seek out the problems and to solve them to the best of their ability. The full co-operation of the research worker, the general and specialized practitioner, the hospital staffs, and the industrial medical officer is the only way by which the fullet results can in the end be obtained in relation to the many and varied problems of health in industry.

OCCUPATIONAL DISEASE

Much work is being done in this country, not only by bodies such as the Home Office Factory Department, the Industrial Health Research Board, the London School of Hygiene and other University Departments, but also by industry itself, to prevent the occurrence of industrial disease. From one point of view alone, the employer of labour recognizes that it is simply not worth while to have disease in industry; the expense is too great. But the incentive for preventive work is not by any means entirely pecuniary. The recognition of a health hazard, often by chance, leads in many cases to extensive investigations carried out by industry in collaboration with the medical profession.

It is interesting to note a present-day trend of such investigations. The great importance of co-operative work is only now becoming recognized. It is so often a sheer waste of time for one person to try to solve some of the problems of to-day; such as those on chemical, physical, engineering and medical aspects which cannot be solved, save in the rarest of instances, by one man alone. And it is this practical application of preventive medicine in collaboration with other branches of technical science which is proving to be one of the most fascinating problems in the whole field of industrial hygiene. The following example illustrates this point[1] :—

Some three years ago in a small factory in the Midlands it was noticed that operatives in certain occupations were inhaling dust known to contain silica. This particular occupation did not come under what is known as the Silicosis Scheme—in other words, the materials used were not considered to be of a harmful nature in that they contained comparatively small amounts of free silica.

The practical steps then taken were in sequence as follows :—

1. Chemical analysis of the dust or " bodies "* used in the process showed the percentage of silicon (SiO_2) present. Comparison was then possible with present-day knowledge regarding toxicity.
2. Dust counts and physical examination of the " bodies " found in various parts of the factory showed exactly the " danger zones " in the factory, i.e. the particular occupations which were potentially dangerous as sources of inhalation of silica.
3. Clinical and radiological examination of a number of employees, both in " danger zones " and in safe zones—where dust counts were within normal limits—showed a most interesting parallel with the dust counts. Where dust was abnormally concentrated positive medical evidence was forthcoming.

N.B.—Although at the time the condition noted was not that of any known pathological condition the evidence was sufficient for the matter to be considered of potentially serious importance.

4. Operatives with " positive " signs were gradually drafted to non-dusty and open-air jobs. This step of providing alternative employment meant close co-operation with the management, frank discussion with trade union representatives, and the whole-hearted support of the operatives themselves.
5. As the " danger-zone " processes involved were essential for the efficient production and the continuance of the industry it was felt that the only way to solve the problem was for the dust to be eliminated at its source. Engineering methods were applied and by a new method of dust extraction the " danger zones " were

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* The term used for materials used in process.

reduced in dust concentration to a normal level, thereby rendering the process potentially safe for the operatives.

This is a résumé of nearly three years' work and the results obtained were only made possible by the close and cordial collaboration of the management and workers, the chemist, the physicist, the ventilating engineer, and the medical officer.

Many other instances also could be given of this practical aspect of industrial hygiene in relation to preventive medicine, but one further example only will be mentioned. The presence of lead poisoning in the electric storage battery industry has been almost entirely eliminated by collaborative investigation such as has been described. Lane's work on the prevention of industrial plumbism[2] is of great significance and well exemplifies the type of preventive work that can be undertaken in industry by members of the medical profession. With the progress of industry, and particularly of the chemical industry, new toxicological problems will undoubtedly arise from time to time. The increased use of solvents, dyestuffs, plastics, resins, and so on, all may conceivably give rise to physiological and pathological upsets; the early recognition of clinical signs of poisoning, the careful medical examination and supervision of employees, and, perhaps most important of all, the early investigation into the biological reactions of the many raw materials used and the products of manufacture, will certainly tend more and more to make industry safe for the worker.

ENVIRONMENTAL WORKING CONDITIONS

It is often difficult to say just how far the medical officer should take upon himself to give technical advice on environmental conditions in the factory. As a general rule, however, he has a definite duty to bring to the notice of his management any conditions which may adversely affect health. On health matters he alone can advise, and is retained by industry for that very purpose. His statements regarding such conditions must have reasonable accuracy, for few managements, and particularly those who employ their own medical officers, even in this modern age, can resist the temptation to accept the greater part of everything that comes from the lips of a medical practitioner. If he condemns the lighting, the heating or the ventilation of the shop, it is quite reasonable to expect that his word should lead to action. The medical practitioner coming fresh into industry soon realizes this fact, and if he is wise rarely lays down the law unless he has facts to produce in evidence of his statements. Again, the maxim of collaboration is all important. In the larger industrial organizations an intelligent engineering staff can readily give expert technical advice on the methods of lighting, heating or ventilation, to take these examples—and as a rule much better than the doctor. The industrial medical officer must, however, know sufficient to understand what he is talking about. He sets the ball rolling, and it is up to him to see that the goal is scored—at the proper end.

Pioneer work has been carried out by the Industrial Health Research Board and other organizations in England, on atmospheric conditions in factories and workshops, on lighting and vision, on noise and on posture. Their work has been established as a fundamental basis for the industrialist, and gives him a greater advantage than would have been available ten or twenty years ago. Those engaged in industrial medical practice have a direct duty therefore to apply this work to present-day problems and to lay before the management in simple language the value of such work and its practical application in the factory.

There may be difficulties, however, in introducing such principles of factory hygiene. Not infrequently the works manager has read contemporary literature on the subject. He sees the economic value of such measures. Perhaps his passion for being up to date and alongsides of his competitor sways him into spending money on certain things which he may feel will give him no immediate return, but which nevertheless he feels he has to spend. Such management may be easy to advise. On the other hand, the medical officer may have to strive hard in an attempt to convince industry that certain measures are right and necessary. The difficulty so often is to show that the innovation is economically sound. But when some particular recommendation is not only advantageous to health and a distinct improvement on pertaining conditions, but is also a business proposition, then the medical officer is truly fortunate.

Much, also, can be done by the works' doctor in advising on questions such as lavatory, washing and cloakroom facilities. It is becoming the custom now for managements to submit plans of proposed new buildings to the medical department for its advice on such points. The number of things on which the doctor is consulted is large, as a week or two spent in a large and busy factory will soon demonstrate.

HOURS OF WORK AND OVERTIME

Conditions under which men and women are expected to work in industry are not uncommonly completely unbiological in outlook and the doctor can frequently help in improving such conditions. The number of hours that a man, woman or "young person" should work in the course of a week, for example, is an international problem of the greatest significance to British industry, and one in which every industrial medical officer is intensely interested. A long working week, long spells of work, and continual overtime all tend to increase fatigue, and to produce and prolong absenteeism and for that reason are heartily to be condemned. The recent Report of the Director of the International Labour Office at Geneva, although concerned mainly with the placement of unemployed, is of interest in relation to this point. He stated :—

> "To some it may perhaps seem a matter for surprise that the movement in the direction of shorter hours should have continued in spite of the progress of recovery . . . the general belief that a further reduction of hours in industry is sooner or later inevitable does not seem to have been seriously shaken," (during the past year).

That is all to the good, if only from the view-point of the individual and his health. Overtime and long hours of work are major problems in industry to-day, and the direct interference of the medical officer where such conditions obtain can be a practical measure of not inconsiderable value.

The introduction of properly organized rest-pauses into industry has been an innovation of very great importance, biologically and economically. No sensible person with an understanding of human physiology could ever agree to conditions such as the following :—

> A girl leaves home at 6.30 a.m. after a breakfast consisting of a hurriedly swallowed cup of tea and a piece of bread and jam. She travels fifteen odd miles by bus or train, and arrives at work at about 7.45 a.m., often tired and apathetic. She works on a monotonous repetition job from 8 a.m. till 1 p.m. without a break except to go to the lavatory, where she lingers with her friend (girls always go in twos or threes to the lavatory), and surreptitiously eats a sandwich brought from home. She works again from 2 p.m. to 7 or 8 p.m. with only the legal half-hour break. And then home to bed, tired and depressed, in spite of overtime rates of pay.

This condition of affairs still applies to many thousands of girls in industry to-day. No wonder there is a large labour turn-over in some factories, and a high sickness rate. Much, however, can be done and is being done by industry to improve such conditions. The introduction of rest-pauses, the reduction of overtime, and the introduction of broadcast music at definite periods during the day, are some of the measures which are being introduced, and, although only palliative in relation to the whole sociological problem, do very considerably help. And, in addition, they have proved to employers of labour to be measures after their own heart; shop discipline is strengthened, a state of contentment is produced, absenteeism and labour turn-over are reduced, all of which have a practical bearing on output and efficiency.

THE INDIVIDUAL

Much can be done for the community as a whole in relation to faulty hygiene. The results too are often dramatic and give satisfaction both to the worker and his employer. But perhaps the aspect of most importance in industrial hygiene, in the broadest sense of the term, is the influence that the medical man or woman can exert on the individual. Sir George Newman said, " . . . in a civilized state it is the nature and nurture of the individual . . . which is at the foundation of national health." And if at the foundation of the whole then surely of the part which is industry. No longer can the man or woman in the factory be thought of merely as an operative on a particular process, but rather as the " homo," the individual " trying to live his life in a system which is the direct result of applied science."

In comparison with what is done for the sick and injured individual there is little being done for the man or woman with " dis-ease," that symptomless disease so full of symptoms, who never thinks of going to the panel doctor or the hospital just because he is not " ill," who spends two-thirds of his waking time in industry and whose character and future are more strongly influenced there in this age than in probably any other way. The child of fourteen, for instance, comes in constant contact with the hardened adult, with the supervisor who perhaps has little or no insight into the adolescent mind, and with a machine whose object is production at all costs. Despite everything industry must go on; it must produce commodities, employ labour and, to live, make profits. What then of the individual? The medical man in industry can do much to help and in some ways is ideally placed and fitted for such work. Every advantage won for the group helps the unit; all the points regarding communal hygiene must and do influence the individual enormously. By teaching and example, by throwing light on the significance of the human factor in industry, and by helping, even in a small way, the person in trouble—advice in all matters can so readily be given by the medical practitioner—in these ways the medical officer can help to produce, at least in part, a state of contentment if not of actual happiness in the individual.

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THE PREVENTION AND CURE OF OCCUPATIONAL DERMATITIS

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THE problem of occupational dermatitis is by no means easily solved by the separation of worker and irritant since neither of these last are of a constant type and their mutual contact produces an infinite variety of responses. Some suggestions are put forward here as to methods whereby such responses may be minimized to some extent. The problem of prevention and cure of occupational dermatitis may perhaps be logically attacked in four directions:—(1) Inspection of the human material *before* it is brought into contact with recognized irritants. (2) Inspection of that material during, and subsequent to, such exposure with particular regard to the investigation of cleansing and protecting measures for the skin. Due consideration must be devoted to the question as to *how* suspected irritants cause disturbance. (3) Disposal of, and early care of, human material after skin damage. (4) Suitable re-employment of such material after apparent recovery.

INSPECTION OF THE WORKER PRIOR TO EMPLOYMENT

There can be no question but that certain physical types, and certain departures from normal epidermal health predispose to skin inflammation when such individuals are in frequent contact with dust or liquids known by previous experience to act in an injurious capacity to others. It would thus appear of value to carry out some form of routine investigation and inspection of workers prior to employment. The following outlined questionnaire (section A) may be suitable. This form can be filed when completed and utilized later to insert any details (in section B) regarding departure from skin health. Should a number of such departures be found in workers similarly occupied, correlation of evidence with reference to early symptoms, method of spread, times of exposure and so on can be obtained. Were such forms widely utilized and, in cases of subsequent dermatitis, forwarded to the Home Office for filing, much evidence of interest and value could be later obtained as to the relation of such dermatitis with other departures from the physiological mean.

SECTION A

Investigation of all cases prior to employment:—

Physique: Good, Medium, Poor. Height............ Weight......
Complexion: Fair, Medium, Dark, Congested.
Temperament: Introspective, Excitable, Phlegmatic.
Skin: Greasy, Moist, Dry, Hairy, Infected, e.g. Acne..................
Other Abnormalities ....
Scalp: Greasy, Dry, Seborrhœic, Bald, Healthy, Alopecia areata.
Hair, Colour: Fair, Medium, Dark, Red. Scanty, Thick.
Sebaceous glands of back: Under-secretion, Normal secretion, Over-secretion, Acne, past or present.
Teeth: Gingivitis, Pyorrhœa, Caries, Good, Edentulous, Dentures.
Hands: Cyanotic, Hyperæmic, Dry, Moist, Warm, Cold.
Tongue: Dirty, Clean, Flabby, Glazed.
Tonsils: Large, Small, Septic, Normal, Absent.
Thyroid Gland: Large, Small, Hard, Soft.

INTERNAL.
Alimentary: Constipation, Diarrhœa, Gastric disturbance, Normal.
Cardio-vascular: Pulse-rate............ Varices, Angio-neurosis.
Pulmonary System: Asthma, Bronchitis.
Genito-urinary System: Menorrhagia, Dysmenorrhœa, Amenorrhœa, Albumin, Sugar.
Hæmatopoietic System: Anæmia, Plethora, Normal.
Musculo-skeletal System: Rheumatism, Fibrositis.
General Personal Cleanliness: Good, Fair, Bad.
Underclothing: Excessive, Normal, Deficient, Clean, Dirty, Cotton, Wool.

REMARKS:

(Negative findings to be deleted.)

SECTION B

Investigation of cases complaining of dermatitis:—

EXAMINATION:
Description of lesions (distribution and character)

Site of lesion at onset
Sites of subsequent lesions and history of spread
History of progress and relapses
PAST HISTORY of any previous skin lesion and treatments applied as far as ascertainable.
FAMILY HISTORY of skin lesions such as eczema, urticaria, or of allergy such as asthma, hay-fever
PERSONAL HISTORY of above
Occupation at time of onset and details of materials handled (with particular reference to hours of exposure to water)
Length of time in this occupation
Previous occupations since commencing work and details of materials handled, with dates
Methods of cleansing skin

The majority of the questions asked are based on obvious reasons, but perhaps some explanation should be given as to why they may be of value :—

Physique.—It is very questionable indeed whether or not the apparently healthily-built individual is in any respect less liable to superficial disturbances than the " weedy " worker. Evidence in this direction is desirable but not at present available.

Complexion.—It would appear likely that the darker coloured person is less liable to irritative trouble than the fair type. Such immunity is probably due to a thicker, and more actively grease-producing, skin.

Temperament.—Variations in this characteristic have been shown to be directly related to sudorific activity of the hands. Such activity probably has a relation with liability to dermatitis of the hands in the presence of possible irritants.

Scalp.—It is generally acknowledged that the seborrhœic individual is prone to generalized skin affections, not only on account of the infective nature of the eruption but also on account of the underlying diathesis of seborrhœa, with its accompanying gingivitis, constipation, anæmia, rheumatism, impaired peripheral circulation. Such persons are unduly superficially sensitive to irritants.

Hair colour.—Information in this direction is desirable. Beyond the seborrhœic element above mentioned which is probably more common in darker individuals, but little information is available.

Sebaceous activity.—The back is an easily accessible area of skin for inspection. Its physical and pathological characteristics form suitable criteria in judging predisposition to furunculosis, "oil acne," and seborrhœa.

Teeth.—Gingivitis, pyorrhœa and dental sepsis alike predispose to, and aggravate, existing eczematous eruptions. Early caries may indicate calcium metabolic dysfunction or a seborrhœic diathesis.

Tongue.—The surface, tone, and colour of the tongue give some indication of alimentary efficiency and particularly of a possible hypochlorhydria—this last is a definite aggravating factor in skin disturbances.

Tonsils.—Obvious foci of infection in these glands can but exercise a bad effect on concurrent dermatitis even if they are not solely skin disturbances.

Thyroid.—An over-active thyroid with its accompanying delicate skin texture and hyperidrosis plays as marked a part in many skin disturbances as does the atrophic thyroid of myxœdema with its dry, unhealthy skin, lowered local metabolism and lessened resistance.

Minor internal departures from health are often of interest in their association with trade dermatitis. As a simple example of this it may be mentioned that not only are low-grade infective disturbances of the epithelium secondary to chemical disturbances of the skin and its secretions induced by external, chemical and mechanical agencies; but they are also possibly induced by alterations in the p^H index of the perspiration. Chemical disturbance may be metabolic in origin in that it may follow impaired metabolism of food. It is by no means unlikely that the eruptions of pityriasis alba, seborrhœa, rosacea, and folliculitis which accompany achlorhydria are due to chemical alterations in the sebum. Again, minor departures from the healthy mean of digestion may encourage bacterial growth superficially and act as a contributory cause of occupational dermatitis.

The pulse rate is worthy of note as an index of excitability and perhaps of hyperthyroidism. Considered in conjunction with other physical factors, it may give an indication of a possible subdivision of individuals into the still valuable groups of " vagotonics " and " sympatheticotonics." Asthma and bronchitis are asked about not only because of the paramount importance of pre-existing allergy, but also on account of septic absorption from the bronchitic mucous membrane.

The anæmic individual would appear to be more liable to skin dyscrasias than the plethoric. Menorrhagia and dysmenorrhœa also, in their relationship with general physical efficiency, are also worthy of inclusion for possible correlative purposes in any investigation as to the associated symptoms of skin allergy. Rheumatic tendency should also be referred to on the same grounds. Consideration of personal cleanliness, independent of reference to *methods* of cleansing, is essential. Inefficient cleansing is probably almost as important a factor in certain particular groups of occupational dermatitis as is over-cleansing in others. Wool underclothing is an invariable factor in aggravating widespread skin disturbance. Persons who volunteer the remark that they cannot " stand wool " next to the skin are usually individuals whose skin is more easily upset than the average.

The presence of varix and of varicose dermatitis, ulceration, or pigmentation should make an employer very chary as to the risks of employing a worker in any occupation likely to involve exposure to possible irritants. A high proportion of persons so afflicted will develop skin changes on the trunk and arms sooner or later. It is difficult at a later stage to separate the etiological element of varix and trade irritant in the subsequent eczematous outbreaks.

INSPECTION DURING EMPLOYMENT

During employment instructions should be placed regularly and prominently before the employee regarding early notification of " sores," " redness " and " irritation." Such lesions should be treated immediately by the methods found most suitable for the particular branch of industry concerned. It may be argued that such impressions continually made on the workman's mind will tend to over-emphasize the risks of his work and induce unnecessary complaints. In practice such fear is without foundation, since the workman realizes that he is just as great a loser as his employer, or his employers' insurance company, when he is not working. It is generally recognized that a superficially and recently fissured skin reacts to rest and protection with great rapidity, but a skin in which secondary infection and infiltration have occurred may be most obstinate in its response and may even allow absorption into the deeper tissues or into the blood stream to occur. This latter occurrence results often in a general sensitization which perhaps renders the worker permanently unsuitable for his original employment. A little thought makes it abundantly clear that physical factors are probably much more blameworthy in occupational dermatitis than the purely chemical factor. In a high proportion of cases in which the latter type of irritation is commonly accepted as sole cause an aggravating and contributory effect is exercised by physical elements. Amongst these often overlooked details are those of heat, friction, perspiration, interference with skin radiation, trauma, stretching of skin and maceration of the surface by overlong immersion in innocuous fluids and by mechanical blockage of sebaceous ducts.

A few simple examples of these will suffice. A stoker developed recurrent attacks of acute dermatitis of the face when he was compelled to place coke manually on his fires, but when supplied with a machine to do this, enabling him to avoid the direct effect of the heat rays, he remained free from trouble. Yet the atmosphere was equally loaded with dust and chemicals—influences certified as causative. A stone-mason, after some weeks handling sandstone in large sections developed fissures of the fingers and palms with consequent secondary infection and cellulitis of the arm—had he utilized leather gloves so as to maintain an intact epithelium his disability would not have occurred.

Eruptions due to excessive perspiration are common, and a cool atmosphere will appear to render a man free from what has previously been considered an epidermal sensitization.

An example of this is provided by a " back filler " who developed acute dermatitis of forearms, legs, and face when in one part of the building, but when working less than a hundred yards away in a cooler part of the factory he was able to handle exactly similar chemicals without inflammatory response.

Interference with skin radiation produces dermatitis in workers, with or without a pre-existing hyperidrosis, wearing rubber gloves for long periods. The skin produces moisture, such moisture cannot evaporate, overheating, maceration and breakdown follow. Such a chain of events explains to the lay mind why men handling recognized irritants are not apparently protected from such irritant by impermeable rubber gloves—the common explanation that "fluids run down inside the glove from above " is not usually correct. Friction and trauma are perhaps not always recognized in searching for the explanation of dermatitis in those handling flour and sugar. It is admitted that both these are hygroscopic and that various adulterants are often present which may act as chemical irritants but the mechanical factor of the multiple sharp-edged particles of sugar is disregarded. The dryness of the skin renders mild friction much more harmful than it otherwise would be.

Clean oil and lubricants are probably not often injurious except when they hold a suspension of fine metallic chips and dust. Friction of the skin, particularly over less toughened areas thereof, produces a dermatitis. Prolonged immersion of the skin in water will induce secondary changes, which in turn render the skin unstable—an example of this was seen by the writer recently in a glass-cutter who was compelled to work in fresh water cutting glass—the only possible irritant was the mechanical one of glass particles. These last caused no discomfort except when work was carried out under water for hours at a stretch.

The mechanical blockage of sebaceous ducts will produce in many the disturbance known as "oil acne." Secondary folliculitis may be induced either by the infection of the oil prior to immersion, and by a secondary infection of the cyst developing below the comedo from the individuals' own organisms. An instance of the former etiology was recently encountered in a group of machine makers all working successively in the same oil tank—each had their own towels. In view of the fact that three men out of five were consecutively infected with furunculosis of the forearms without previous complaint, it was considered that the oil was the vehicle carrying the staphylococcus.

METHODS OF CLEANSING

Attention is frequently insufficiently directed towards the question of the methods of cleansing adopted by the employee during, or at the end of, his day's work. A few simple examples of dermatitis due to such hygiene, or lack of it, may perhaps be quoted.

A young pastrycook developed, after eighteen months' work, a dermatitis of the hands and wrists. She was correctly certified as a case of "trade dermatitis"—tests of her skin against sugar, flour, eggs, colouring materials, butter and suet all proved negative. Inquiry showed that she was in the habit of rinsing her hands to remove dough and sugar at least eighty times during the day's work. She dried her hands, "occasionally," on a small and invariably damp towel. The provision of a large absorbent towel combined with instruction as to the need of firm and regular drying enabled her to continue her duties without further delay.

A group of carriage workers employed on cleaning, varnishing and painting the interior of railway vehicles developed a mild superficial squamous dermatitis of hands and forearms. The railway company concerned put themselves to considerable trouble and expense testing out and analysing the various preparations with which the workers came into contact—no unusual irritant was detected, but the trouble continued. Eventually inspection showed that sand, soft soap and scrubbing brushes of almost wire-like texture were provided for the "end of day" toilet. Removal of these and a substitution of a castile soap and softer brushes brought about a cessation of trouble.

French polishers, and painters alike often use turpentine, strong soda and ammonia to remove stains at the end of their work. All these, persisted in for varying periods, remove the natural protective grease of the human skin and will eventually induce temporary or permanent change. Dye dermatitis is far more often a result of the methods adopted for the removal of dye than it is the result of the irritating effect of the dye itself. In the North of England it is a common remark made by an employee in the dyeing and bleaching industry that he finds his hands and arms smart only at the end of the day when he has ceased work. Such discomfort is the direct result of using what he terms "chemic"—a mixture of soda ash and bleaching powder. Leaving the skin "dirty" will result in the disappearance of the symptoms. Reference will be made later to the methods of "logical" cleansing—the cleansing agent employed must be chosen with a common regard to the æsthetic result of such cleansing, to the neutralizing effect of such cleansing on possible irritants left in situ, and to the avoidance of agents which may act as irritants to a hitherto unharmed skin.

PROTECTION DURING EMPLOYMENT

The skin may be protected mechanically or chemically. The former methods are obvious, provided they do not in themselves cause disturbance. Rubber and leather gloves may alike prove injurious because of the impermeable nature of the materials themselves. Prolonged maceration secondary to prevention of evaporation and excessive raising of local temperature may alike produce " dysidrotic " eczema. If gloves are to be worn they must be loose enough to allow a circulation of air and thick enough to avoid splitting. At the end of a day's work they should be washed with fresh water outside and in, and thoroughly dried. A thorough powdering with some bland absorbent powder prior to their use the following day is essential. Leather gloves, as used in the tanning industry, may occasion harm by becoming hardened and causing friction over constant areas. Frequently the " tanning " of the glove causes it to lose its own elasticity and split, thus allowing irritant chemicals to reach the skin actually at points of trauma and friction. Exposure to defatting agents and even mild " frictioning " substances may sometimes be lessened by the frequent smearing of the skin with greases. Such protectives, however excellent in theory, are in practice of doubtful value, since, unless regularly employed, they are removed easily and the skin forthwith exposed. The ideal protective would, of course, be a " film " of such grease held by the epithelial cells and actually absorbed therein.

Sleeves and wristlets of tough textured cotton, possibly impregnated with neutralizing chemical, are insufficiently employed in industry. The workman objects to anything which interferes with the free movement of his arms or does not like to be stigmatized as having a tendency to " skin disease " and refuses their use—yet the wrists and forearms are more delicate in superficial texture and, therefore, less resistant than the hands towards irritants. It is perhaps a " nuisance " to have to change such sleeves frequently, but unless changed they become soiled, greasy, and infected, giving rise to local infection instead of a chemical dermatitis—almost as crippling a disability. Chemicals, as above suggested, may be impregnated in order to prevent deposit on these more delicate areas. Sodium bisulphite to counteract bichromate in lithographers or dilute alkali in those coming into contact with citric acid in the fruit industry are of value. Perhaps, however, a regular rinsing of the hands and arms in these neutralizing agents during work is of more constant value and is a simple procedure. Among the commoner preparations widely used as protectives are lanolin (an animal fat), vaseline (a mineral base), oil of theobroma, neutral soaps (rosalex), and emulsions. The latter two examples would appear capable of holding within themselves particles of carbon, metal, oils and, to a less extent, dyes. When washed an emulsion is formed which carries away with it the irritant which has been unable to reach the epithelium except in small amount.

INQUIRY CONCERNING AFFECTED CASES

Any case reported as suffering from dermatitis must be reported on *primarily* without reference as to external irritant—or indeed as to etiology at all. When these points have been noted then, and then only, should attention be focused on causation. The questionnaire (section B) is put forward. On obtaining these particulars consideration of etiology is permissible. Should the earliest lesion noted be in an area away from the irritant, e.g. anus (pruritus), ankle (varicose eczema), scrotum (tinea), retro-auricular fold (seborrhœa), axilla, groin or feet (fungus), then subsequent involvement of exposed areas may be due to a general sensitization from such a focus via the blood stream rather than local sensitization by contact of allergen from without. Consideration of etiology as a result of such determination is of specific value and attention on correct dermatological lines will not only relieve the local, but also the general disturbance. It may be noted here in parenthesis that the application of an irritant dressing to a varicose dermatitis or a chronic pruritus ani may induce a widespread eruption which is clinically undistinguishable from a general trade dermatitis.

The etiology of relapses in cases of trade dermatitis is one of the most difficult and debatable. When complete recovery has occurred and if the patient has not been re-employed in contact with the alleged irritant, further outbreaks must be regarded with the gravest suspicion. It is conceivable that once the human skin has been rendered unstable then substances, previously innocuous, will act as irritants and a skin, for many years stable, will develop not only excessive local response to external application but may even develop generalized disturbance from endogenous antigens. To carry this conception further one occasionally encounters individuals in whom a generalized dermatitis has been unquestionably produced by an external irritant and later such skin responds abnormally to other factors. Septic absorption, incomplete alimentary metabolism, and even mental stress act as provocatives. A probable explanation of this chain of circumstances may be found in the physical background of the patient. It is suggested that the original trade dermatitis may have followed on certain metabolic or endocrine alterations in the " soil " on which it appears. The external irritant is merely a catalytic factor bringing about an " explosion " and, no doubt, a number of external and internal agents could, in the first place, have brought about the first reaction. In later stages it is found by the clinician who has the case under observation that influences, independent of occupation, will re-develop outbreaks on the skin. It is not clear, and so far as I am aware, no statistics on the point are available, as to whether trade dermatitis more commonly affects workers with a personal or familial history of allergy. A history of asthma, hay-fever, urticaria or eczema in a given case is but rarely volunteered unless particular inquiry is directed thereto. Even then answers may be incorrect or evasive on account of a fear that liability on the part of the employer or his representative, may be refuted on the receipt of a positive reply.

In collecting details regarding a case of dermatitis during employment a very thorough investigation as to the details of work, hours of exposure, preparations handled, methods of cleansing, home circumstances and home habits must be made. To discuss them in detail here would be too lengthy, but several points may be briefly mentioned. For example, if a known irritant is handled, question must be made as to how often and for how long a period this substance is encountered. How is it removed from the skin? What methods, if any, are adopted for counteracting its activity? Do attacks of irritation always follow its contact? Is it only on exposed areas that reactions occur? Are other workers similarly affected? Have any minor changes in type of material recently occurred?

Inquiries about personal hobbies must be made. Are the outbreaks seasonal? May they be due to fertilizers in the man's own garden? May they be due to exposure to plants in the home? Is any energetic soap or disinfectant used by the worker in his or her own home? These latter points are of paramount importance as exemplified by a case recently seen of dermatitis of the hands.

A young married employee of a calico printing company developed an affection of the fingers and wrists solely due to a strong proprietary soap used in the cleansing of her own household floors. An examination of the skin merely revealed a localized dermatitis which no clinician could claim as being of obvious etiology. Change of soap induced a cure and a return to work was undertaken with immunity.

DISPOSAL OF AFFECTED CASES

Clinical experience shows that the majority of cases of industrial dermatitis noticed in the earliest stages can be relieved completely within a very short period.

Careful instruction with regard to future hygiene and conduct at work renders them capable of returning to their original employment with impunity. Sufferers allowed to struggle on with an active disability not only develop severe and intractable local changes, but may progress to a general disturbance. It is a generally accepted theorem that a severe local dermatitis will sooner or later develop a sensitization " eczema " which persists over long periods and is kept active by factors independent of the original etiological one. In such individuals hospitalization, with its removal from home, with its local and general rest, with its enforced regular regimen does much to render the soil less explosive. Such rest, persisted in for some weeks or even months, may allow the skin to settle and regain its stability. For this reason, if for no other, in-patient treatment of generalized eczematous disturbance is essential.

RE-EMPLOYMENT

The return to work of a case of accepted or of a doubtful case of trade dermatitis must be considered with due care. A relapse may ensure for three or more reasons :—(1) True acquired sensitization to a protein at work or to a protein produced in the skin when brought into contact with inorganic substances may have occurred. (2) An inherent weakness of the skin not visible to the naked eye, but nevertheless present, may exist. (3) A nervous element of fear of relapse resulting in either over-cleansing from desire to avoid relapse or a manifest vasomotor abnormality of neurogenous origin causing local erythema and increased capillary permeability may be present. Of these I consider the second group to be the larger, and have discussed the matter elsewhere, but the psychological element should be seriously regarded. A return, if possible, to a duty of similar wage but away from the irritant considered as being to blame should be undertaken. A gradual acclimatization from this is to be attempted. When confidence is established and the worker's wages not reduced, the nervous stress is removed. A gradual approach is the basis of specific desensitization of allergic individuals—is it not reasonable to attempt this in true cases of specific sensitization in workmen? In cases in which the dermatitis is not a protein sensitization much can be achieved along the same lines of thought. Care of the skin during employment by minimizing exposure, by care in cleansing, and by attention to the nervous and physical make-up in many cases enables a worker to undertake the original duties with freedom from recurrence. The conception " once a trade dermatitis always a trade dermatitis " is, when unqualified, baseless.

CONCLUSION

Trade dermatitis is neither a clinical entity of constant etiology nor a disturbance of constant method of production. Co-operation of workmen, employers and medical advisers can achieve a marked reduction in its incidence. Recriminating policy existing between masters' and men's representatives achieves nothing beyond financial bargaining with an eventual loss to both sides. Correlation, and subsequent investigation, of physical and mental signs available to non-specialized medical observers might lead to the elucidation of hitherto unrecognized factors in the development of trade dermatitis. The early notification and treatment of dermatitis when in a stage not producing incapacity for work may lead to shortening of later and more severe disturbances. Sympathetic treatment, and subsequent supervision, of cases of widespread disturbance would lead to less expenditure of " lump sums in settlement " by Insurance Companies and less expenditure on legal procedure on the parts of the workers' representatives. Many hitherto unemployables could be given physical health, mental content, and regular employment by co-operation of employers and medical advisers.

HYPNOTIC DRUGS

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LACK of sleep, or imperfect sleep, is so common a symptom that most practitioners have frequently to treat it whatever their department of medicine may be. This together with the fact that the list of hypnotics is constantly growing both in length and in complexity make it desirable to have some kind of working classification of these drugs from which a suitable one may be chosen and into which new preparations may be fitted as they appear. This article aims at an attempt to produce a simple classification of this kind. At the outset it is well to remember that hypnotic drugs are not the only means available for producing sleep, neither should they be the first remedy to be considered. The normal physiology of sleep is not yet understood, but one of the simplest hypotheses is that put forward by Samson Wright, who states that it may be merely the damping down of the conductivity in the afferent and association paths of the nervous system. Such a conception, whilst probably not the whole truth, is of use to the clinician in that it serves as a reminder of the paths by which sleeplessness may come. There are the extero-ceptive impulses from the external environment of the patient through the surface of the body and the special senses; the proprioceptive impulses from the posture of or pressure upon muscles, bones and joints, and from the large group of visceral stimuli amongst which the cardio-vascular, gastric and rectal are the most important. In insomnia due to these latter stimuli an alkali or carminative, if there is flatulence, or an enema, if the rectum is loaded, will produce sleep as readily as a hypnotic. Lastly there is the over-activity of the higher centres themselves, the psychic causes of insomnia, one of the commonest of which is the fear that sleep will not be obtainable and of the dire consequences that are likely to ensue. Correction of abnormalities in what may be briefly termed the external and internal environments of the patient may of itself prove to be a hypnotic measure. In spite of this correction, or because it cannot be wholly effected without them, recourse to hypnotic drugs will often be necessary.

THE IDEAL HYPNOTIC

This would have the following properties :—

(1) It would be "light," that is to say, readily absorbed so that a reliable effect is produced at a regular interval after administration.

(2) It would be rapidly broken down, but not too rapidly, or excreted so that, on the one hand, it would remain in the tissues long enough to ensure a sufficient length of sleep but, on the other hand, not so long as to cause drowsiness the next day or to produce cumulative effects if repeated daily.

(3) It must not produce side actions either unpleasant, such as preliminary excitement and gastric irritation, or dangerous, such as cardiac or respiratory depression.

(4) There must be a sufficient margin of safety between the therapeutic and toxic doses.

(5) The drug must not produce tolerance or habit when administered over long periods.

No drug possesses all these qualities or ever will, but each new hypnotic as it appears is said to be nearer the ideal, and there is a real danger that the old, well-tried and reliable remedies are apt to be forgotten in the admiration of the new. Most of the new hypnotics are barbiturates; for this and other reasons they are best kept in a group by themselves. If the opiates are also placed in a separate group, the remainder will be chiefly composed of the older drugs. These can be considered under the heading of mild and powerful.

THE MILD HYPNOTICS

(1) The analgesics, *phenacetin*, *phenazone*, *amidopyrin*, apart from allowing sleep by removal of a neuralgic or myalgic pain, have a definite mild hypnotic action. Particularly is this so with *aspirin*, which for most adults and nearly all children is hypnotic.

(2) The *alcohols* would come into this group, though their use for this purpose, except in the case of elderly debilitated patients who are already habituated to them, should be deprecated. *Amylene hydrate*, an alcohol with more hypnotic action than the rest, has fallen into disuse on account of the preliminary excitement it may induce.

(3) The *bromides*, though really sedatives, are useful in the insomnia of over-work, worry and agitated states. They are rapidly absorbed and more slowly excreted and so may give rise to some depression on the following day. They act by virtue of the bromide ion and so there is nothing to choose between the various bromides at our disposal. The slowness of excretion is due to the fact that the kidney cannot distinguish between chloride and bromide and so both are eliminated in the proportions in which they are dissolved in the tissue fluids, a property which is employed when it is desired to hasten the excretion of bromide. *Sedobrol* and similar proprietary preparations are broths containing sodium bromide in place of sodium chloride.

(4) The urea derivatives (other than the barbiturates) are *carbromalum* (*adalin*) and *bromural*, which, as their names suggest, are bromide urea compounds, and *sedormid*, which has no bromide in it. These

substances are mild and light hypnotics, rapid and pleasant in action and without after-effects. Bromural has recently been revived by one of the drug houses and is being pushed as a safe hypnotic which is not a barbiturate; these claims are of course true.

(5) The carbamates, examples of which are *urethane* and *hedonal*, are so mild that for some adults they do not seem to be sufficiently potent. They are rapid, safe, have no after-effects, and can with advantage be used for children.

THE POWERFUL HYPNOTICS

(1) *Paraldehyde* is well known and much used. It operates quickly, has no unpleasant after-effects, and the sleep it gives lasts several hours, being quiet, refreshing and dreamless. It has no depressant action on the heart or respiration and is of special value in delirium tremens for these reasons and also because it is closely allied, chemically, to alcohol. The only dangers in its use seem to be in cases of acute nephritis or when there is advanced cirrhosis of the liver. Objections to its use are the nasty taste and the odour it gives to the breath. These cannot be overcome but the former can be mitigated considerably by giving the drug as an emulsion in which form it is a much more elegant preparation than when merely added to water: 120 minims of paraldehyde can be emulsified in one ounce of water by the addition of 30 minims of tincture of quillaia. The best flavouring agent is liquorice.

(2) The sulphone group, *sulphonal*, *trional*, has justly become unpopular for the action is uncertain, both on account of the slow absorption and also because such drugs act better in some individuals than in others. Excretion of this group is slow, producing drowsiness the next day and a liability to cumulative effects if repeated doses are given. All members of

this series are liable to produce liver and kidney damage and hæmatoporphyrinuria.

(3) The halogen derivatives are some of the most useful sleep-producing drugs available. It used to be taught that they depress the heart in varying degree and should therefore be used with caution if this organ is feeble, but recent work has shown that they exert no toxic action on the cardio-vascular system in therapeutic doses.[1] All are gastric irritants unless given well diluted. None of them is of any use if insomnia is due to pain. *Chloral hydrate* is typical of this group. It is fairly rapidly absorbed, certain and reliable in action and very useful in simple insomnia or in that due to overwork or worry, especially if combined with bromide. Children take it well. A useful preparation that is not used so much as it might be is syrup of chloral which contains 10·9 grains in 60 minims. *Chlorbutol*, better known as *chloretone*, has come to be associated with the treatment of sea-sickness and with its properties as a local anæsthetic, but it is a good hypnotic, having the same properties as chloral with less toxicity and less gastric action. *Chloralamide*, another member of this series, is an excellent hypnotic. It is, however, very insoluble, this property probably accounting for its lack of popularity for, unless given in suitable form, absorption and therefore action may be much delayed. There are three ways in which chloralamide may be given:—(*a*) As a powder, the patient being instructed to dissolve it in a little whiskey and then to add water. If this method is used then the prescription must be for Pulv. chloralformamidi. Should crystals be dispensed, as they may be if the powder be not specified, the patient, after stirring for some time, will either leave the dose at the bottom of the glass or, if conscientious enough to wash it all down, will spend a wakeful night and sleep most of the following day. (*b*) Each

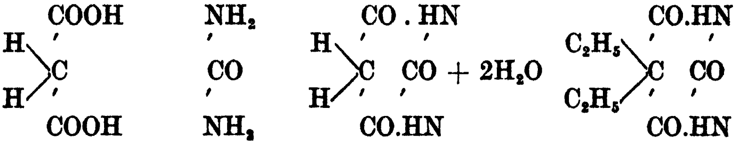
60 minims of spiritus vini rect. added to one ounce of water will take up 10 grains of chloralamide in the cold. There are obvious pharmacological objections to such a mixture if a fairly large dose is intended. (*c*) Tincture of orange, 60 minims with an equal quantity of simple syrup to each ounce of water will take up 30 grains chloralamide with 30 grains of bromide as well, which is as much as is ever required of this useful mixture. The only way to get the drugs into solution is to dissolve the chloralamide in the tincture with gentle heat and then to add the other ingredients dissolved in the requisite amount of water. Chemists seem to be afraid to heat chloralamide because heat dissociates it, but the temperature at which this happens is 130° F. which is above the boiling point of alcohol.

OPIUM

Opium and its derivatives are so well known and so widely used as to need only a brief mention. They are all pre-eminently anodyne in action and are therefore the drugs of choice in the insomnia which is dependent upon painful conditions. They are also indicated in the sleeplessness which is associated with heart disease. Apart from these indications they are not good hypnotics. *Nepenthe* is an elegant and useful preparation one third less strong than the official tincture and without the latter's resinous messiness when diluted. It has the advantage that its name does not suggest an opiate to the uninitiated patient so that it may be added to mixtures containing soluble hypnotics when it is desired to impart some pain-relieving quality to them and later withdrawn. *Omnopon* and *opoidine* are preparations of the total alkaloids of opium which are said to give fewer of the side actions such as nausea and constipation. Omnopon is certainly less nauseating to most patients who are affected that way by morphine. *Spasmalgin* contains a derivative of atropine, papaverine and omnopon. *Trivaline* is morphine and cocaine valerianate. *Dilaudid,* a new preparation, is said to have all the pain-relieving properties of morphine without having any other action. This unfortunately is only partly true but appears to be more correct than the similar claims for omnopon.

THE BARBITURATES

These drugs are best kept in a class by themselves because they exhibit properties and actions characteristic of a group which contains in itself a practically complete range of hypnotics. They are all substitution products of malonylurea which is itself the product of the union of malonic acid with urea.



Malonic acid Urea Malonylurea Barbitone

The malonic acid end of malonylurea has two hydrogen atoms either or both of which can be replaced by organic radicles, which may be of the paraffin series, methane, ethane, or propane having one, two, three and so on carbon atoms in an ascending scale, or of the phenolic C_6H_5 group, or again of the acetylene series, e.g. allyl with three carbon atoms. It is obvious from these few examples of possible linkages that a great many permutations and combinations are possible. If, for instance, the two hydrogen atoms are replaced by two ethyl groups (C_2H_5) the compound so formed, di-ethyl malonylurea, is *barbitone* or *veronal* itself. All such substitution products of malonylurea have a hypnotic action and it would seem that the fewer extra carbon atoms that are attached the lighter, i.e. quicker and shorter acting, the hypnotic will be, and, conversely, the more carbon atoms the heavier.[2] A rough rule for guidance is that an ethyl or methyl group in a barbiturate makes it a light one whilst a phenyl group makes it heavy, and these groups are the most common ones to find, in association with others, so that by looking at the proper chemical name of the drug, which is always printed somewhere on the package or in the literature, usually in microscopic letters, some idea can be obtained of its probable action. Examples of this are *soneryl*, a useful light hypnotic which is butyl-ethyl-malonylurea, whilst pheno-barbitone is *luminal*, so heavy, i.e. long and slow in action, as to be almost useless as a hypnotic but invaluable for other purposes because of these very properties.

Some barbiturates are soluble but most are not. If the sodium salt of any of their compounds is made it becomes soluble and therefore has its rate of action accelerated because solubility increases both absorption and excretion. An excellent example of this is *evipan* which has two methyl groups and which is rapid in taking effect and transitory in the drowsiness it produces. It is applicable to those patients who wake at 3 or 4 a.m. and cannot get to sleep again. Four grains by the mouth will produce three or four hours more sleep and the effects of the drug will be gone by the time the patient wakes again. *Evipan-sodium*, on the other hand, is so rapidly diffusible on account of the increased solubility that when injected into a vein its effects are over in about twenty minutes. There are about 168 barbiturates that can be used in medicine and it is possible in so short an article to mention only a few of them. Some have been dealt with as examples of the common structure, others in frequent use are *hebaral-sodium*, the soluble sodium compound of hexyl-ethyl-malonylurea, which is light, efficient and reliable, giving no heaviness the next day. It is an excellent preparation for bedtime use. Others are *dial*, which though light is not so mild a drug as it is popularly supposed to be, *barbitone* itself and its sodium salt *medinal*, *phanodorm*, *pernocton*, and so on through the series to the really heavy members, such as *luminal*, *luminal-sodium* and *prominal*. Certain barbiturates have found a special use in inducing sleep before anæsthesia, *nembutal* being the best known example. It is said that hebaral-sodium is useful in this respect and does not cause the excitement not seldom seen after nembutal, and that *amytal-sodium* is particularly indicated for premedication in children. This last drug has a special indication in that it may be given by intramuscular injection of an aqueous solution of three grains to calm the almost maniacal excitement sometimes seen in cases of exophthalmic goitre.

Idiosyncrasy to barbiturates is said to occur in 3 per cent. of people, and toxic effects may arise from the administration of quite small doses. These may take many curious forms a few of the commonest being :—

(1) In the skin. (*a*) Urticarial wheals. (*b*) Bullæ. (*c*) Morbilliform or scarlatiniform maculo-papular erthema. (2) Alimentary. (*a*) Anorexia. (*b*) Nausea. (*c*) Epigastric pain. (*d*) Diarrhœa. (3) Nervous. (*a*) Defects of attention and memory, hence their use as basal narotics, and hence, also, their danger if patients are administering the doses themselves. (*b*) Lassitude, fatigue and backache. (*c*) Confusion, delusions and hallucinations. (*d*) Diplopia, nystagmus, ataxia and even coma. (4) Most barbiturates are cardiac depressants of more or less serious nature, and all cause some fall of blood pressure.[3]

An interesting recent development is that, by joining the barbiturate radicle to a metallic base, instead of to sodium, its toxicity and depressant action is diminished. *Calcium phanodorm* has been made, and more of such compounds will be produced in the near future. This detoxicating effect is not limited to this group of drugs. *Calcium aspirin*, for instance, is said to be less toxic, though no less analgesic, than plain aspirin.

In spite of severe criticism of their administration[3] the malonylureas have established themselves as useful and reliable hypnotics, as reasonably safe as most potent medicines if wisely used, and out of the controversy that has raged around them certain rules for their administration have emerged:—

(1) Obese or debilitated patients or those with liver or kidney disease tolerate them badly.[4] (2) Patients with arteriosclerosis, myocardial disease or very low blood-pressure react badly to the shorter acting drugs. (3) Never repeat, for hypnotic purposes, a dose of a barbiturate. (4) Never mix barbiturates. (5) Never give them before, with, or after an opiate. To which excellent rule there is an equally excellent exception, namely, that medinal and nepenthe go very well together. (6) They are better not prescribed in tablet form but in a cachet, as a powder, or best of all in solution. Substitution or reduction of the dose is then possible, which it may not be if the patient has become habituated to a trade-marked tablet.

MIXTURES

Hypnotic drugs are good examples of synergism and for this reason many blendings of them have become traditional, such as pot. brom. and chloral, and all practitioners discover favourite mixtures of their own.[5] In their search for a sleep-producing drug, with pain-relieving qualities, which is not an opium-derivative, the drug houses have put many proprietory preparations on the market which are mixtures, usually in tablet form.[6,7] *Allonal, cibalgin, veramon* are examples of a few. Most of them are mixtures of amidopyrin plus a barbiturate, despite the fact that recent work has demonstated the danger of amidopyrin. There is usually too little analgesic in one tablet and too much barbiturate in two; it is better therefore, if desired, to use such a preparation to prescribe a personally-tested mixture of analgesic and hypnotic.

In the fact that the form in which they are given and that the time of their administration may effect their action, the hypnotics are no exception to other drugs. Solution accelerates their action as does administration at a time when the stomach is empty. It is common to hear patients complain that a preparation upon which reliance can be placed has failed to act when in reality what has happened is that it was taken immediately after a late and heavy meal. For similar reasons if the drug is given in a solid form, particularly as a tablet, the patient should be instructed to take a good draught of water, and not merely sufficient to wash it down.

Thanks are due to Prof. F. R. Fraser for his help and criticism in the construction of this paper.

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GENERAL PRACTICE

NO. III—THE LEGAL ASPECT OF PARTNERSHIP AND ASSISTANTSHIP

By O. A. HEMPSON.

PARTNERSHIP is a large subject and it is possible to discuss it in general terms only. This article is limited advisedly to those considerations which apply particularly to partnerships between medical men. Quite different considerations apply to commercial partnerships and, indeed, to other professions. The subject may properly be considered under two main headings: (1) the relations of the "firm" to outsiders, and (2) relations of the partners—the one to the other.

"THE FIRM" AND OUTSIDERS

The first point can be taken briefly, as medical men will only wish to know wherein they are in a different position when practising in partnership from that when they are practising on their own account. Each partner is the agent of the partnership in respect of all matters done by him which are, or reasonably appear to outsiders to be, within the scope of the business of the partnership. Reducing this to concrete terms it means that if one partner quotes a fee to a patient that quotation binds the partnership; if one partner runs up, say, a drug bill, the partnership is responsible; or if one partner is guilty of negligence the partnership as a whole can be sued and any judgment obtained can be enforced against all or any member of the partnership. (It should therefore be a rigid rule of the partnership for each partner to be a member of a defence society and to be punctual with his subscription.) More than this need not be said under this head, as the practitioner in partnership is otherwise in very much the same position as when in practice by himself.

BETWEEN PARTNERS

The second heading is the relations of partners between themselves. Partnership can be created verbally, without any document, in which event its terms are regulated by the provisions of the Partnership Act. Admirable though this act is, its provisions are more appropriate to commercial than to professional partnerships, and it too often proves a broken reed when the partners cannot agree or when it comes to a crisis such as the disposal of the share of a partner who has died. Accordingly the terms of Articles of Partnership should be considered carefully and signed at or immediately before the beginning of the partnership. But notwithstanding any Articles of Partnership, the law imposes on partners, as might be expected, an obligation to use the utmost good faith towards each other, and to give to one another the fullest access to books and all necessary information regarding their activities so far as the work of the practice is concerned. Finally—and this is often overlooked—each partner has an equal say in the management of the practice and the conduct of its affairs generally, whatever the actual shares may be, though any difference arising as to ordinary matters connected with the partnership business is, subject to any provision in the Articles to the contrary, governed by majority rule.

Partnerships can be for a specified term of years or for life. A term partnership is sometimes suggested by practitioners who feel hesitant in binding themselves to a partner for the rest of their working lives, with the idea that it provides an easy means for them to end the association and start afresh. This is perfectly true up to a point, but do they appreciate what it entails? When the term of years has elapsed, the partners are only partners at will, and the partnership can be determined by either partner at his pleasure, whereupon both partners are left free to practise in opposition without restraint, the assets of the practice being sold and the proceeds divided between the partners. Now if either partner dies or wishes to retire from practice, either voluntarily or through ill-health, shortly after such a dissolution has taken place, he or his representatives will wish to sell his practice, but the chances of sale at a good price are likely to be seriously affected by the fact that his late partner is still practising in the neighbourhood in opposition. Even apart from this, he is unlikely to get as good a price from a purchaser for his one-man practice as he would for a share in a partnership.

It is suggested, therefore, that partnerships should be made for life, giving either partner a right to retire after a specified date, making provision for compulsory retirement in the case of permanent incapacity, and expulsion for misconduct, and ensuring that when a partner ceases to be a partner he is restrained from practising in the district. In any of these events the continuing partner is either given an option to purchase the other's share (with a provision that if such option is not exercised the share can be sold in the open market, the purchaser being taken into partnership by the continuing partner subject to a reasonable right of refusal), or it is made obligatory on him to do so. Of the two alternatives the latter has much to recommend it. In case of death it is suggested that it is essential.

It must be borne in mind that the continuing partner has really complete control of the position. He can, if he chooses, by giving an unfavourable account of the practice to all prospective purchasers, and adopting an unfriendly demeanour, render a sale impossible, until at length the executors are driven to accept any offer that he himself cares to put forward. There is also the difficulty of determining how the assets and profits of the practice shall be dealt with pending the sale of the share.

Some prospective partners may feel that in binding themselves to purchase they are taking on too big a potential liability, but is it really so? In the first place, they are entitled to some consideration in the price which they have to pay, since the retiring partner or the estate of the deceased partner is relieved of the numerous expenses attendant on the sale of his share in the open market (such as agents' commission), which expenses are transferred to the survivor. It can also be provided that the purchase money can be paid by instalments. In any case as a last resource a medical practitioner can, with the facilities now available, almost always borrow on the security of his practice. Moreover it is nearly always necessary for a fresh partner to be admitted, when the purchase money which he pays will provide, if not all, at least a substantial part of the purchase money payable to the retiring or deceased partner. The great advantage, though, of this provision from the point of view of the continuing partner is that he can then choose his own future partner and sell to him such a share as he thinks fit.

DISSOLVING THE PARTNERSHIP

Prospective partners are inclined at first blush to consider provisions for expulsion of little moment, believing that occasion will never arise, but surely they are of paramount importance and, as it is impossible to say how much harm a partner's misconduct may do to the partnership goodwill, the purchase price to be paid for his share by the continuing partner should be at a penal rate, and substantially below the market price. The question of retiring a partner for permanent incapacity is always difficult.

There should be a provision that during any incapacity of one partner, the other partner is at liberty to engage a locum tenens, if necessary, at his expense. This right to appoint a locum ought to arise not, as is provided in so many cases, after, say, a month's incapacity, but at once. Otherwise a partner might absent himself for three weeks, return to work for a short period, absent himself for a further three weeks and so on, thus defeating the other partner's right to appoint a locum. This has actually happened on more than one occasion within my knowledge and it is remarkably difficult to prove conclusively that a partner is not incapacitated when he alleges that he is! The protection to the sick partner in cases in which the illness is not likely to be prolonged is that, as most medical men know, a locum tenens is for the first few days often more responsibility than help. The other partner, who is doing probably the major portion of the sick partner's work, is the person primarily entitled to consideration, and it need not put the sick partner to any expense, as he ought to be insured against sickness and accident, when the policy moneys would cover the cost of the locum. As it is almost impossible to define what is meant by permanent incapacity the only practical thing is to fix any definite period for incapacity and to agree that if it continues beyond this it is to be deemed permanent. Naturally the period should be considerable and provision should also be made for recurrent periods of shorter duration; many illnesses or injuries may render a partner incapable of working in the practice for a matter of months but yet will leave him perfectly fit after that time to resume his full duties again. In a partnership in which there is proper give-and-take the matter will be dealt with, no doubt, on reasonable lines, but not all partnerships are in this happy position and it is when the proper spirit of partnership has gone that the Articles become of most value; for instance I know of two partners who did not speak to each other for over five months! The only fair solution, it is suggested, is to fix an arbitrary period of six to nine months, in addition to which there should be a total of two or three hundred days in broken periods over any two years, to cover the case of recurrent illness.

As for the purchase price to be paid for the outgoing partner's share, the position arising is so analogous to that when a partner dies, that the terms should be the same.

CREATING THE PARTNERSHIP

Turning now to the creation of the partnership it is strongly recommended that the books be investigated in every case by an accountant who is familiar with books kept in medical practices. This is as desirable in the interests of the established man as of the new partner, as it tends to avoid possible misunderstanding in the future. Who would buy a house without having it surveyed? Still more is it important to have investigated that which is to constitute a future source of livelihood. Vendors in shares in partnerships should, nevertheless, be particularly careful in any representations they make as to the receipts and expenses of the partnership, as if these turn out to be substantially incorrect, as a recent case has emphasized, the purchaser will have the right to rescind the agreement, however innocently the error may have occurred.

The Articles of Partnership should set out amongst other things (1) what expenses are to be paid out of the partnership funds and what by the partners themselves; in the latter category it is recommended that motoring expenses be placed, as it is always difficult to differentiate the professional use of a car from its private use; (2) how the accounts of the partnership are to be taken; (3) at what periods the partners are to be entitled to draw on account of their share of profits; (4) what rights (if any) the junior partner is to have to increase his share and the purchase price he is to pay for any share so purchased. This is normally based on the purchase price which he pays for his original share; (5) the method of deciding on the fees to be charged; (6) the method of engaging and dismissing servants which, except in the case of flagrant misconduct involving instant dismissal, should be by consent of all the partners; (7) the right of absence for holidays; and (8) what rights (if any) the continuing partner is to have over the house occupied by a retiring or deceased partner on the purchase of his share, which usually takes the form of an option to purchase or take a lease at a valuation. Whether or not this is included, it is not unfair that the outgoing partner or the representative of the deceased partner should be restrained from allowing it to be used by a practising medical man for a certain number of years.

Frequently it is suggested by the junior partner that there should be a right to require the compulsory retirement of any partner on his attaining a fixed age, at which he is unlikely to be able to pull his weight. This may well be considered fair.

Often it is suggested that a clause should be inserted providing for the shares of the partners to be adjusted to their earnings, but this is open to objection. The value of a partner does not depend entirely on his earnings, nor may a partner's abilities and opportunities lie in the direction which is the most remunerative for the partnership, although his value as a partner may be not less in consequence. A large panel practice, for example, is universally considered a good standby, but if this is concentrated in one partner (usually the junior partner) the amount he earns from it may not anything like represent the amount of work he has done or the value of the panel practice as a nucleus for goodwill. In any case, such a provision tends to competition between the partners, and for this reason alone is to be deprecated.

Finally, there should be a provision that arbitration should in the last resource be the means of settling partnership disputes, and not litigation. It must always be remembered, however, that even arbitration is an expensive luxury. Surely two grown men can with reasonable give-and-take settle their own differences, or failing this can realize that future co-operation is impossible, and settle between themselves the terms on which they will separate?

ASSISTANTSHIPS

Practitioners must remember that even as they are responsible for the acts of their partners, so they are responsible for the acts of their assistants. It has been seen how a partner can be made liable in damages for the negligence of his partner—even so he can probably (the word "probably" is used designedly, for there is room for doubt as the law is not settled) be made liable for the negligence of his assistant. It is necessary to make absolutely certain therefore that any assistant is a member of a defence society. Moreover, it might be argued that an assistant is a servant in law just as a chauffeur is, and that therefore the principal is liable for the negligence of the assistant when driving his motor-car on his master's business. Therefore it is necessary to make sure that an assistant has a valid motor-car insurance in force.

Once more, as in the case of partnership, there should be a written document setting out the terms of the contract between the principal and the assistant. The point which concerns the principal most when engaging an assistant is to see that he is restrained from practising in the neighbourhood on the strength of his introduction after the assistantship is over, and this restraint must be in writing.

RESTRAINTS

This subject, which is one full of pit-holes, has not been discussed under the heading of partnership because it is probably more appropriately dealt with here. All restraints on practice, which are classed in law with restraints on trade, are frowned upon in law as being contrary to public policy in that individual members of society are thereby restrained from giving the public the benefit of their ability and professional or technical skill. This view has, however, been modified to make it possible to sell goodwill, and to make it possible for a master to protect himself from his late servants' competition. But any such restraint must be reasonable and must be strictly limited to what is really necessary for the protection of the purchaser or the employer. If it goes beyond this it is void, and not only void to the extent by which it goes beyond what is necessary, but void altogether. Whether or not a restraint is reasonable must depend on the area and nature of the practice and in the case of an assistant on the length of time for which he has been employed. It will be obvious that an assistant who has been engaged in a practice for three months could not fairly be bound out of practice in the same town for twenty years.

Finally, a covenant in restraint of practice requires "consideration," that is to say, something in return, which "consideration" must be something in the present or future and not in the past. The effect of this is, as applied to assistants, that a bond entered into by the assistant on the termination of his employment in consideration of the salary he has received in the past is bad, which accentuates the advice given earlier in this article, namely, to settle the terms and sign the document before starting.

The document should also set out (1) the salary which the assistant is to receive; (2) whether or not he is to run his own car, and what allowance (if any) the principal makes towards the expenses of doing so; (3) whether or not he pays for his own board and lodging; (4) that the assistant is to give his whole time to the practice; and (5) to keep accounts; and (6) the rights of the parties to terminate the agreement. In the absence of any agreement on this last point it is governed by what is the custom of the profession, which may be a difficult matter to prove to the satisfaction of the Court. Neglect to provide for this may result in a principal having to continue to employ an unwanted assistant or else to pay him salary in lieu of appropriate notice.

Provision should also be made for the assistant's holiday and for the possibility of his incapacity, when it is usual for the salary to cease after, say, a fortnight; special provisions may be inserted where the assistant goes on the panel in his own name giving the principal the right to sign for the assistant the form of resignation and appointment of the principal as his successor on the termination of the employment.

One last word:—the parties can always vary either Articles of Partnership or an Assistantship Agreement at will. Verbal variations may be quite effective, but should it be necessary to prove them evidence is not always easy to obtain. In every case they should be recorded in writing.

PRACTICAL NOTES

THE TREATMENT OF PRURITUS

While agreeing that removal of the cause is the ideal remedy for the relief of itching B. Fantus and T. Cornbleet (*The Journal of the American Medical Association*, June 20, 1936. cvi, 2144) in an excellent review of the therapy of pruritus point out that such an ideal is not always attainable, and takes some time during which relief must be afforded. From first principles they suggest that itching may be reduced by lessening the blood-supply to the skin, soothing the sensory nerve endings, softening the epidermis and depressing the sensory nerves. The following prescriptions are offered as fulfilling some or all of these considerations :—

℞	Menthol	2½ grains
	Alcohol	15 minims
	Talcum	1 ounce

For use as a dusting powder after sponging the skin with 5 per cent. sodium bicarbonate in very hot water.

In conditions where softening is not desirable the following solution can be applied as a gauze compress :—

℞	Menthol	¼ grain
	Boric acid	200 grains
	Water	1 pint

For soothing the nerve endings the addition of carbolic acid to calamine is often effective :—

℞	Phenol	15 minims
	Calamine lotion	5 ounces

Again when there is an excoriated surface, as for example, in infantile eczema, a drying paste may be more suitable as an anti-pruritic medium such as :—

℞	Phenol	2½ minims
	Tragacanth	25 grains
	Glycerin	10 minims
	Water	to make 1 ounce.

Apply to itching part and allow to dry.

For depression of the sensory nerves an ointment or lotion may be applied containing menthol and phenol the strengths of which may be varied according to circumstances, being kept low if the skin is acutely irritated. Two examples are as follows :—

℞	Menthol	5 grains
	Phenol	10 grains
	Rose water ointment (B.P.C.)	1 ounce
℞	Menthol	5 grains
	Phenol	10 grains
	Alcohol	1 ounce

(NOTE.—These prescriptions have been freely adapted to correspond with British usage.)

SALINE TREATMENT OF BROMIDE RASH

A cutaneous eruption due to bromides is one of the most striking and most troublesome of drug reactions. It appears that bromide intoxication has little if any relation to the age of the patient or the amount of the drug ingested. Treatment to be effective must increase the bromide excretion and this can be produced, according to H. C. Li (*The Chinese Medical Journal*, May, 1936, l, 665) by the use of sodium chloride as was first pointed out some years ago. He recommends the injection intravenously of normal saline and for an adult he gives two doses of 400 c.cm. with about a week between followed by a third dose of 200 c.cm. ten days later. The skin lesions begin to disappear rapidly after the first dose and bromide reappears in the urine following the administration of sodium chloride. Other workers have found that giving salt by the mouth produces similar beneficial results. It has been recommended to give 60 grains of sodium chloride with salol per day until there are signs of improvement. The combination of the intravenous and oral routes of administration can also be used.

ADRENAL CORTEX AND VITAMIN C IN DIPHTHERIA

It is well recognized that circulatory failure including that of peripheral circulation as well as of the heart is the serious problem to be faced in diphtheria. Various means have been discussed in recent years for dealing with this complication and H. Bernhardt (*Deutsche medizinische Wochenschrift*, July 10, 1936, lxii, 1123) has now recorded very successful results with the combination of various methods. He used a preparation of suprarenal cortex, vitamin C, in its synthetic form, glucose and saline. Using the electrocardiogram to indicate the earliest possible changes in the heart he advocates the intravenous injection of 5 to 10 c.cm. of a suprarenal cortex preparation, 2 c.cm. of " Cebion " (vitamin C), in combination with 20 to 40 c.cm. of 10 per cent. glucose and 10 c.cm. of 10 per cent. sodium chloride. The injections can be repeated every second or third day on one or two subsequent occasions depending upon the results obtained and obviously there must be some variation in dosage in each individual case. Since introducing this form of treatment into his clinic, Bernhardt claims that he has not lost a patient treated in this way with severe diphtheria.

EARLIER DIAGNOSIS OF CARCINOMA OF THE CERVIX

Stressing the fact that the modern operative and radiological methods of treating carcinoma of the cervix are probably unlikely to be further improved C. H. Tyrone (*New Orleans Medical and Surgical Journal*, August, 1936, lxxxix, 29) indicates that a further reduction in mortality can only be expected by earlier diagnosis. For this purpose he discusses in some detail two aids which have been developed in recent years. In the Schiller test, iodine in the form of Gram's solution is applied over the portio vaginalis. The normal squamous epithelial cells contain glycogen which absorbs the iodine, and these areas stain a deep mahogany brown. In the areas of beginning malignant change, the cells have become atypical, with atypical nuclei, have lost their glycogen and therefore do not accept the stain but appear as pinkish or faintly stained regions. However, this non-staining quality is also distinctive of other conditions, and it must be emphasized that the Schiller test is only an aid to facilitate diagnosis of early carcinoma and that it is not a proof of the presence of carcinoma. The second aid is the colposcope with which it is possible to study minute regions of the cervix highly magnified so as almost to permit of viewing the various cell changes taking place without actually removing tissue. It is probably of more value than the Schiller test because erosions can be studied and it furnishes a surer method of obtaining biopsy material.

THE USE OF EVIPAN IN OBSTETRICS

The search for an ideal anæsthetic in midwifery continues and in several quarters evipan-sodium is gaining supporters. According to van Boven (*Bruxelles-médical*, July 12, 1936, xvi, 1391) this drug possesses many advantages such as the slow easy passage into narcosis without a period of excitement, the fact that it can be used with a non-fasting patient, and the large margin of safety between the effective and the toxic dose. One gramme of evipan-sodium is dissolved in 10·5 c.cm. of distilled water, the solution being prepared immediately before use. The intravenous injection is begun at a rate not exceeding 1 c.cm. of this solution per half minute and at the end of two to three minutes the patient becomes unconscious. It is suggested that dropping of the jaw is an easily recognized sign of commencing anæsthesia and when this appears the injection of the drug can be continued at the same rate until a quantity equal to that already injected has been given. It has been found that 6 to 10 c.cm. represent the usual doses required. Sufficient anæsthesia is obtained for simple procedures such as application of forceps, internal version, removal of a retained placenta, perineal sutures, and a period of fifteen to twenty minutes sleep is generally obtained. It is stated that no deleterious effect has been noticed upon the new-born baby with the dosage here described.

AUSCULTATION OF THE ABDOMEN

Despite the statement by Cannon thirty years ago that the study of the sounds produced by movements of the alimentary canal might be of clinical value, this subject has been greatly neglected. N. C. Stevens (*The New England Journal of Medicine*, July 2, 1936, ccxv, 22) has studied the results of auscultating the abdomen with particular reference to the peristaltic rate which he states is no more difficult to determine than the pulse rate. This normal peristaltic rate varies with the time of day and becomes more active after each meal. After the stimulating effect of the meal has passed away, the normal rate is between five and ten tinkles per minute. Under conditions of hypermotility this may go as high as fifty or even become a continuous gurgle. Also during hypermotility the normal high-pitched tinkle shifts to a harsh and low-pitched gurgle. With practice, the distinction between normal and abnormal sounds becomes easy of recognition. The application of this clinical method of diagnosis is illustrated in such examples as a silent abdomen in peritonitis, the extreme hypermotility of the bowel in cyclical vomiting of children and early vomiting of pregnancy and also an accelerated rate present in nervous indigestion.

SIXTH DISEASE

Mainly confined to children under two years of age and apparently occurring in mild epidemics a new exanthema is discussed by J. R. Dreyfus (*La Presse médicale*, July 18, 1936, xliv, 1162). After an incubation period of three to seven days the temperature rises to about 102° F., lasting for three days when it falls by crisis. The general condition of the infants is satisfactory, there is no special change in the throat and the lymphatic glands are not enlarged. On the fourth day, corresponding with the abrupt drop in fever, a rash appears first on the trunk, especially on the back composed of small spots 2 to 5 mm. in diameter of a bright pink colour. The rash spreads to involve the head and neck, chest and limbs. It has obvious resemblances with German measles and may have also a scarlatiniform appearance. It disappears apparently within twelve to forty-eight hours without desquamation. The blood count shows a slight degree of leucopenia due to a diminished number of polymorphononuclear leucocytes. The prognosis appears to be excellent and there is no special treatment indicated. The author suggests the name " sixth disease " for this malady.

BENZEDRINE SULPHATE FOR GASTRO-INTESTINAL SPASM

Spasm in the gastro-intestinal tract is a major clinical problem of particular importance to the radiologist since it is not an infrequent and confusing factor in the X-ray examination of the alimentary system after an opaque meal. According to A. Myerson and M. Ritvo (*The Journal of the American Medical Association*, July 4, 1936, cvii, 24) benzedrine sulphate can be safely and usefully employed for the relief of spasm of the stomach and intestines, whatever the cause. The dosage for an average patient is 30 mgm. of the drug orally; very stout patients may require 40 mgm. and young, thin individuals need only 10 to 20 mgm. The patient is given the opaque meal as usual followed by X-ray examination. If these is spasm that does not disappear after manual pressure, reassurance and the other customary manoeuvres, the tablets of benzedrine sulphate are given with a few sips of water. After five to ten minutes X-ray observations and the taking of films are again carried out. The six-hour, twenty-four-hour, or other desired observations are made as usual. It is claimed that satisfactory disappearance of the spastic manifestations is secured in over 85 per cent. of patients. Unpleasant effects may occur in a small number but on the whole the drug can be regarded as non-toxic. It is also stated that benzedrine sulphate has a therapeutic value in cases of spastic colon and pyloric spasm.

COD-LIVER OIL APPLICATION IN EYE DISEASES

The use of cod-liver oil dressings for various conditions of the skin secondary to trauma has been reported in recent years and E. Stevenson (*The British Journal of Ophthalmology*, July, 1936, xx, 416) now reports the employment of this substance in injuries of the eye. In a severe case of burning he applied one drop of weak atropine solution and dressed the burn with a thick pad of gamgee soaked in ordinary cod-liver oil covered with oiled silk and a bandage. The patient was instructed to keep the pad moist by pouring some oil on the outside if it seemed to get dry. Very good results were obtained particularly as regards absence of scarring of the lids. Other cases have now been treated with severe abrasions, ulcers, keratitis with swollen lids and similar chronic lesions. It is recommended that the oil be not used until any active septic process has subsided. A specially characteristic feature is rapid healing of blepharitis and the promotion of the growth of normal tissue. A special drop bottle is advised and one is made by Messrs. S. T. Pearson and Co., Ltd., Mitcham. The only disadvantage of the treatment appears to be the smell, but since small quantities only are used for the eye this is of little consequence.

SURGICAL TREATMENT OF SCIATICA

After discussing a classification for sciatica including the following groups:—fibrositis, pelvic growths, growths of the spine or spinal cord, sciatica with lumbar scoliosis and with sacro-iliac disease, A. Rendle Short (*The Bristol Medico-Chirurgical Journal*, summer, 1936, liii, 87) mentions that there still remains a group in which are many of the severest cases and the most resistant to treatment. He considers that sciatica of this type, when the other causes have been excluded, may often be due primarily to neuritic adhesions between the nerve and the structures which surround it at the sacro-sciatic notch. In the anatomy room a fibrous band is not uncommonly found in the neighbourhood of the greater sciatic notch and the type of trouble produced is analogous to that found in the arm in cases of so-called " cervical rib." An exploratory operation with division of the band of adhesions with a blunt hernia knife is reported in several cases with complete cure of the sciatic pain. It is suggested that in cases suitable for treatment the muscles supplied by the external popliteal nerve will shown most wasting.

REVIEWS OF BOOKS

The Relief of Pain : A Handbook of Modern Analgesia. By HAROLD BALME, M.D., F.R.C.S. With an Introduction by SIR E. FARQUHAR BUZZARD, BT., K.C.V.O., M.D., LL.D. London: J. and A. Churchill, Ltd., 1936. Pp. xvi and 392. Price 12*s*. 6*d*

THE ever-present problems of pain have in the past been discussed from various angles; thus James Hinton, the mystic and aurist, in the " Mystery of Pain " and John Hilton, his colleague at Guy's Hospital in his "Lectures on Rest and Pain" seventy and more years ago, have been followed by the investigations of James Ross of Manchester, Lennander, James Mackenzie, Henry Head and John Morley. In this useful volume the relief of pain is systematically considered by a former professor of surgery at the Cheeloo University, China, who is pleasantly introduced by the Regius Professor of Medicine at Oxford with the benediction " It is not Dr. Balme's fault that the problem of pain has not been finally solved." In an early chapter the pathway of pain is discussed in an interesting manner and it is pointed out that, although Head's deductions are not all accepted, there is general agreement that painful sensations reach the sensorium by a route different from that followed by ordinary tactile sensation. Libman's method of diagnosing hyper- and hypo-sensitiveness is mentioned and his conclusions that Jews are hypersensitive and red-Indians hyposensitive are confirmed by observations made by the author during the South African War at the beginning of this century. The greater part of this practical handbook is devoted to a detailed account of pain and the measures for its relief in the various parts of the body, from the head to the nails (splinters under) including those of labour. Intractable pain is considered in a special chapter and in touching on the difficult subject of euthanasia the author rightly says that it can never claim to represent the ideal conquest of the difficulty, for there is only one ideal to be aimed at, namely the discovery of methods which rob pain of its terrors and make life both bearable and easy for the hopeless incurable during the months or years that lie before him.

The Endocrine Organs in Health and Disease. By SIR HUMPHRY DAVY ROLLESTON, BART., G.C.V.O., K.C.B., M.D., D.SC., D.C.L., LL.D. Oxford University Press. London: Humphrey Milford, 1936. Pp. xii and 521. Plates 35 and 10 illustrations in the text. Price 36s.

UNDER the terms of the Fitzpatrick Trust the lectures delivered on some historical subject before the Royal College of Physicians of London must be printed and published in a separate book. This volume is the result of Sir Humphry Rolleston's delivery of these lectures in 1933 and 1934 on the history of the endocrine organs. The time was undoubtedly ripe for a survey of this subject which has grown from such small beginnings into a gigantic conception to which new facets are constantly being added. It is, moreover, a subject to which British workers have contributed a notable share al
it is to Claude Bernard that tribute must be given for his

investigation of the internal secretions, far ahead of contemporary thought and somewhat neglected for thirty years after publication of his work. The present book will be greatly valued not only for its survey of endocrinology as a whole and in detail for the various glands of internal secretion and for the many charming pen-pictures of the pioneers in the subject but also, and more particularly, for the bibliographies interspersed at appropriate places in the text, which appear to cover each portion of the subject in an amazingly complete manner.

The Adrenals. By ARTHUR GROLLMAN, PH.D., M.D. London: Baillière, Tindall and Cox. 1936. Pp. xii and 410. Illustrations 17. Price 22*s*. 6*d*.

THE author, formerly associate professor of physiology and now associate professor of pharmacology and experimental therapeutics, in the medical school of the Johns Hopkins University, has reviewed the existing knowledge, especially of a chemical and physiological character, of the adrenals. He divides the structure of the adrenals into three layers, the additional one, besides the well-known cortex and medulla, being that known as the fœtal cortex, the boundary zone or the *x*-zone, which disappears after birth. As hyperplasia and tumours of this fœtal cortex are regarded by the author as responsible for the adreno-genital syndrome and a masculinizing effect, it is given the new name of androgenic tissue; and, though the exact embryological nature of this androgenic zone has not yet been determined, it may well be that it has a common origin with the " testicular " cells of the ovary, assumed by Krabbe to be the cause of the adreno-genital syndrome. The physiology of the medulla and epinephrine is considered at length and the " emergency function " of Cannon and Elliott's view that adrenaline is necessary for the maintenance of normal sympathetic impulses are adversely criticized. The adrenal cortex and its hormone are dealt with in great detail from many angles and with due caution. The volume concludes with a summary of the existing knowledge about Addison's disease and other disorders of the adrenals.

The Vegetative Nervous System: A Clinical Study. By WULF SACHS, M.D. With an Introduction by SIR WALTER LANGDON BROWN, M.D., F.R.C.P. London: Cassell and Co. 1936. Pp. x and 168. Plates 6, 35 illustrations in the text. Price 15*s*.

THIS able summary of the present state of knowledge of the anatomy, physiology, pharmacology, the clinical disorders, tests and diagnostic criteria, is the outcome of much research in the laboratory, the wards, and the library. For example in the years 1928–1932 the author carried out more than ten thousand tests on European patients and on normal and abnormal South African Natives, each patient being examined by fifty different tests. In 1909 Eppinger and Hess, pupils and followers of von Noorden, elaborated the clinical pictures of disorders of the vegetative nervous system, and, mainly on the reactions to adrenaline and to pilocarpine and atropine, formulated the conceptions of vagotonia (hyperparasympathicotonia) and sympathicotonia. This distinction and the pharmacodynamic tests have been severely criticized, and it is now clear that these two symptom-complexes are comparatively rare, occurring in extreme cases only, and that most of the patients belong to the so-called mixed types—the amphotonic or neurotonic. An appendix shows the author's method of carrying out the clinical examination, and in a bibliography of ten pages the most important papers on the subject are listed.

The Toxæmias of Pregnancy. By DAME LOUISE MCILROY, D.B.E., M.D., D.Sc. London: Edward Arnold & Co., 1936. Pp. 355. Price 14*s*.

DAME LOUISE MCILROY has produced a most interesting volume on this very difficult subject. The book is founded upon the Ingleby Lectures of 1924, which have been greatly amplified. The toxæmias of pregnancy are a most complex problem and it is impossible to depart from purely theoretical considerations when dealing with their etiology. As the author remarks, " our knowledge of the etiology of toxæmia is so vague and the whole subject so controversial that I have found great difficulty in making any definite statements about it "; for this reason, the book is of special interest to those who are concerned with the more theoretical side of obstetrics. A broad classification has been made by differentiating between hepatic and renal toxæmia; in the former case the prognosis is good because recovery is, as a rule, complete. In the renal type of toxæmia the damage produced is likely to be permanent. The importance of making the exact diagnosis is stressed, for in the renal type subsequent pregnancies are fraught with great danger. It is pointed out that ophthalmological examinations are specially useful in the differential diagnosis. The chapter on symptoms and signs of toxæmia deals with the subject in its widest aspects. Fibroids and pregnancy are included because of the toxæmia produced by degenerative processes. For the same reason, there is included a discussion on infection of the urinary tract. An excellent bibliography supplies the reader with additional references, although the text is filled with the names and quotations of two hundred and forty-four workers in this field. After a perusal of this excellent book, the reader will have before him a complete and unbiassed résumé of the whole subject of the toxæmias of pregnancy.

A Textbook of Obstetrics: For Students and Practitioners. By FREDERICK C. IRVING, A.B., M.D., F.A.C.S. New York and London: The Macmillan Company, 1936. Pp. 558. Figures 357. Price 25*s*.

THIS book is from the pen of the professor of obstetrics at Harvard Medical School. It is another volume, of moderate size, which covers the whole field of obstetrics and is intended for the use of both practitioners and students. Several of the chapters are written by others who are specially qualified to discuss such subjects as heart disease in pregnancy, and diseases of the new-born infant. The text is of special interest in that it embodies the policies and practice of the Boston Lying-in Hospital over a period of the last few years. There are numerous drawings in simple black and white which are very clear and easy to understand; they are a great help when studied in conjunction with the text. The volume is well and concisely compiled, and demonstrates a clear and simple method of teaching which can only come from those who are experienced in teaching this difficult subject to students. A chapter on puerperal infections is excellent, and well illustrated with temperature charts taken from actual case sheets, which form of illustration is of value to practitioners. This is altogether an excellent book.

Medical Aspects of Crime. By W. NORWOOD EAST, M.D., F.R.C.P. London: J. & A. Churchill, 1936. Pp. 437. Illustrations 18. Price 18s.

THIS book consists of a number of papers which have been published from time to time by the author on certain aspects of criminology and penology, and therefore there is nothing consecutive in the various sections. As the author states, a systematic treatise on these subjects is premature in our present state of knowledge, and this book is issued with the object of placing on record certain observations which should be of service should such a systematic treatise be attempted by anyone in the future. The first part is devoted to a description of medical administration of prisons, historical and otherwise, and details are given with reference to treatment and dietaries. This is followed by an article on attempted suicide, which will be found of very considerable interest. This paper, however, is almost entirely reprinted from a study published in 1913, and therefore the important period covered by the war and after, has been missed. Views on the effect of alcohol and of mental conditions on suicide have been considerably altered by observations made in that period, during which the consumption of alcohol was reduced to a considerable extent without any corresponding fall in the suicide rate. The bibliography of suicide is not brought up to date, and deals almost entirely with papers published before 1913. The article on exhibitionism is well written and will be found of considerable interest to those medical men who have to deal with accused persons. Dr. East devotes a section to the relation of the skull and brain to crime. This article consists of his Henderson Lecture which was delivered in Edinburgh in 1928. It is mainly composed of extracts from Goring's work on the English convict and, as has been pointed out by Mercier, these observations were made not on criminals as a whole, but on persons who had been convicted, and who were therefore probably mentally inferior to those who had escaped apprehension. Further sections are devoted, among others, to problems connected with the prosecution of offenders; with sterilization of criminals, and with observations on mental defect and insanity. Dr. East's book will serve a useful purpose in bringing before members of the public interested in crime a number of problems over which they may ponder at their leisure.

Alcoholism in General Practice. By A. E. CARVER, M.D., D.P.H., THOMAS HUNT, D.M., F.R.C.P., and SIR WILLIAM WILLCOX, K.C.I.E., C.B., C.M.G., M.D., F.R.C.P. London: Constable and Co., 1936. Pp. xi and 131. Price 7*s*. 6*d*.

THIS account of alcoholic addiction is divided into three parts. In the first Dr. Carver, medical director of Caldecote Hall, Nuneaton, which is supported by the Church of England Temperance Society, sketches the psychology, etiology, and clinical classification, and describes fully the various methods of treatment, psychological, medicinal, general and institutional. In the second part Dr. Thomas Hunt of St. Mary's Hospital writes on the general and physical effects of alcoholism with wise moderation; thus he points out that there is not any certain evidence that alcohol as such can directly induce high blood-pressure or arteriosclerosis, recognizes the importance of idiosyncrasy and variations in tolerance, and states that many people can consume considerable quantities of alcohol daily throughout their lives without any demonstrable pathological effects on either bodily function or structure. The medico-legal aspects of the subject are authoritatively set out by Sir William Willcox.

Diseases of the Respiratory Tract : Eighth Annual Graduate Fortnight of the New York Academy of Medicine. By TWENTY-ONE CONTRIBUTORS. Philadelphia and London : W. B. Saunders Co. 1936. Pp. 418. Price 24*s.*

THIS interesting collection of lectures covers a wide field from Professor A. R. Dochez's account of the common cold, which as a rule every man, woman, and child in the United States experiences between two and three times annually, and carcinoma of the lung, on which Professor Lloyd Craver writes. Thus in his discussion of the relation of allergy to diseases of the respiratory tract Dr. M. A. Ramirez emphatically insists that iodides, administered intravenously in the form of sodium iodide, give better results in asthma than when taken orally. Lipiodol is, he considers, of value in chronic asthma with bronchiectasis and chronic bronchitis, 20 c.cm. being injected into each descending bronchus every two weeks on 4 to 6 occasions. Some patients, however, are hypersensitive to iodine, and a striking photograph of the face of a patient with severe angioneurotic œdema, also involving the tongue and pharynx, which came on about two hours after an intracheal instillation of 20 c.cm. of iodol, is given. Professor Chevalier Jackson lectured on bronchoscopy; Professor Jonathan Meakins, of Montreal, on chronic " pneumonitis," in the production of which collapse, among other causes, plays a prominent part; Professor Yandell Henderson, of Yale, on atelectasis, massive collapse, and related post-operative conditions; Professor George Blumer, also of Yale, on pulmonary thrombosis and embolism, and Professor A. R. Rich on immunity in tuberculosis.

British Masters of Medicine. Edited by SIR D'ARCY POWER, K.B.E., F.R.C.S., F.S.A. London : *Medical Press and Circular*, 1936, Pp. xv and 242. Illustrations 34. Price 7*s.* 6*d.*

THE lives of twenty-four medical Fathers, from Harvey to Starling. have been reprinted from the *Medical Press and Circular* in a well got-up volume. Two of the twenty-five authors, Professor W. Blair-Bell and Dr. Theodore Thompson, are now dead and the latter's account of Thomas Addison was finally brought out by his son, Mr. H. R. Thompson. Like Sir William Hale-White's " Great Doctors of the Nineteenth Century," published last year, it contains much interesting information.

Studies on the Healing of Fractures. By John Hertz, M.D. London: Humphrey Milford, Oxford University Press. 1936. Pp. 286. With 82 figures. Price 15*s.*

This is a monograph on experimental surgery, discussing the subject with special reference to the significance of the vitamin content of the diet. Its author is an assistant surgeon in Copenhagen and the work has been in part carried out there and in part in the department of histology, Stockholm. Experimental fractures in guinea-pigs and rabbits have been produced by use of a new instrument and from very careful studies it is concluded that vitamin C deficiency inhibits the early stages of inflammatory reaction at the site of fracture, and that vitamin A, alone or with vitamin D, is essential for adequate callus formation. This is a somewhat bald statement of the carefully recorded conclusions to justify which microphotographs are plentifully provided. There is a good bibliography and the translation into English has been made by Dr. Hans Andersen.

Modern Professional Nursing. By Douglas Hay Scott, M.B., Ch.B. London: The Caxton Publishing Co, 1936. Vols. 4. Pp. 1308. Illustrations 613. Price £4 4s.

This work covers the syllabus of the General Nursing Council for the general part of the State Register. The sections on anatomy, physiology and hygiene are good: the selection of diagrams and illustrations could not be better, and the matter is presented in a lucid and attractive way. The medical and surgical sections of the syllabus are satisfactorily covered on the whole, though a nurse would look in vain for guidance in the nursing of cases of thyroidectomy or in the use of avertin. The chapters on infectious fevers are up to date and helpful. The chief criticism of the work as a whole is the absence of nursing detail, both in the nursing section and throughout the book. A list could be made of modern nursing treatments which receive no mention. The colloquialism of the style in some parts of the book is to be deprecated. In spite of these criticisms the volumes would be a useful addition to any library of nursing, though the price is probably prohibitive for the majority of nurses.

NEW EDITIONS

Taylor's Practice of Medicine (J. & A. Churchill. 28*s.*) edited E. P. Poulton, D.M., F.R.C.P., in its fifteenth edition is well on its way towards jubilee celebrations for it was in 1890 that it first appeared. The Guy's school are well maintaining the reputation of this textbook, but on this occasion Dr. Poulton has secured outside help in one important respect for Dr. Hamilton Fairley has almost entirely rewritten the section on tropical diseases presenting an excellent account of these maladies in only 130 pages. During the six years since " Taylor " last appeared there have been many changes in medical outlook, more especially in certain aspects of treatment and these are well reflected in the appropriate sections. It is a pity that the word " radiogram " is employed for the majority of the excellent plates in view of its now common association with wireless apparatus. The typography and general production are well up to the standard expected from Messrs. Churchill.

Text-Book of Pathology by Sir ROBERT MUIR, M.S., M.D., Sc.D., LL.D., F.R.S. (Arnold 35*s.*) is now issued in a fourth edition which is likely to prove as popular as its predecessors. Additions to knowledge have been made in various departments in the past few years and the author has made a judicious selection of new material for presentation. Primarily a textbook for students this volume has continued in succeeding editions to maintain this outlook. Sir Robert's wide experience in teaching has enabled him to keep the matter up to date without overburdening the student with unconfirmed speculative material. The illustrations, to which additions have been made, continue to be a valuable feature of this book.

Applied Physiology, by SAMSON WRIGHT, M.D., F.R.C.P. (Oxford University Press, 20*s.*) is now well established as the best textbook of its kind and this sixth edition, with 90 new illustrations, well maintains the reputation earned for previous issues. It is thoroughly revised, containing well-balanced references to recent advances in the subject.

The Anæmias, by JANET VAUGHAN, D.M., M.R.C.P. (Oxford University Press, 12*s.* 6*d.*) is issued as a second edition only two years after it first appeared and such an unusual proceeding for a monograph of this nature is due to the great activity shown by research workers in this branch of clinical pathology. Although there are less spectacular advances to be recorded than in proceeding years there has been much useful work recently accomplished and it is faithfully recorded here.

Text-Book of Pathology (Delafield and Prudden), revised by F. C. Wood (Baillière, Tindall & Cox, 45*s.*) for its sixteenth edition can claim to have reached its jubilee for it was in 1885 that it first was printed. Extensive revision has been undertaken, especially in the sections dealing with the nervous system and with the special pathology of the muscles, bones and joints. Dr. Francis Delafield was a practising physician with a large autopsy experience and the final chapter on the method of making post-mortem examinations is still one of the best written summaries of this subject, bringing a valuable work of reference to a suitably practical close.

Minor Surgery by FREDERICK CHRISTOPHER, S.B., M.D., F.A.C.S. (W. B. Saunders, 42*s.*), in a third edition, has been extensively revised and material added deals with such subjects as new methods for promoting wound healing, effort thrombosis, leech treatment of phlebitis and torus fractures. The subject matter sometimes becomes distinctly major but the practical note is held throughout and the text is usefully documented with references.

NOTES AND PREPARATIONS

THE ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

This Association, the first of its kind in this country, was formed during 1935 and has now successfully completed its first year's programme of meetings under the Chairmanship of Dr. N. Howard Mummery (Medical Officer, J. Lyons & Co., Ltd.). The object of the Association is that medical men and women who devote the whole of their time to the subjects of industrial medicine and hygiene should meet together occasionally to discuss problems of mutual interest, on a comparable basis to other medical and scientific societies. Meetings are held four times a year, three meetings in the London School of Hygiene and Tropical Medicine, by courtesy of the Board of Management, the summer meeting being held in the provinces. This year the provincial meeting was held in Birmingham. The Honorary Secretary of the Association is Dr. Donald Stewart, M.D., M.R.C.P. (Medical Officer, Imperial Chemical Industries, Limited), Kynoch Works, Witton, Birmingham, to whom all communications should be addressed.

RESPIRATORY DISEASE IN THE COTTON INDUSTRY

A useful report on the well-known respiratory disease from which a large proportion of cotton operatives suffer has been issued by the Medical Research Council (Special Report Series, No. 212. 2*s*. 6*d*.). Prof. Carl Prausnitz has been responsible for an excellent comprehensive investigation of the problem and it seems clear that the essential cause of the malady is a specific agent in cotton dust, probably contained in the protein fraction and conveyed by very small particles. It seems clear from the results obtained that there is only one method of overcoming this disability of the cotton industry, and that is by preventing access of the finest dust to the respiratory tract. It would appear that the ventilating and exhaust appliances which are now generally in use, although they remove the coarser particles of cotton dust from the atmosphere, do not in fact prevent access to the worker of the finer particles which are particularly susceptible to the dust. Now that this essential fact is established by Prof. Prausnitz, the practical problem seems to rest on the need of discovering a method of removing these finer particles. The ingenuity of the engineer which is shown in the modern machinery of the cotton industry ought to have relatively little difficulty in solving this mechanical problem and so eliminating an important cause of ill-health among industrial workers.

NEW PREPARATIONS

Antivenomous Serum E.R. (Pasteur) is prepared from horses immunized against the venom of European snakes. The dose is 10 c.cm. subcutaneously or intramuscularly. The dose for children and adults is the same. It is supplied as an outfit of one 10 c.cm. ampoule and one hypodermic syringe complete. The serum remains active for four years. The price of the outfit is 10*s.* 6*d.* Messrs. Allen & Hanburys, 7, Vere Street, London, W.1, are supplying this.

HYDATID FLUID obtained from hydatid cysts of bovine origin prepared by the Commonwealth Laboratories of Australia. Hydatid fluid is used in the Casoni intradermal test for hydatid disease. It is available in 1 c.cm. ampoules price 5*s.* each from Messrs. Allen & Hanburys, 7, Vere Street, London, W.1.

SCUROFORM DENTAL SOLUTION is 10 per cent. butoform in glycero-alcoholic solution for the local anæsthetization of mucous membranes. It is easily applied with a small pad of cotton wool saturated in the solution. Pharmaceutical Specialities (May & Baker), Ltd., Dagenham, supply this new product in boxes of six phials each containing 1 c.cm. of the solution at 2*s.* 6*d.* per box. A sample will be sent on request.

BOURNVILLE COCOA

This well-known and popular food needs no recommendation to the medical profession. It is claimed that the recipe for this cocoa has not been altered since it was first introduced thirty years ago and a recent analysis shows the following composition :—

		Per cent.
Fat		26.5
Protein		18.1
Cacao starch and other digestible carbohydrates		36.0
Mineral Salts		7.7
Stimulants	Theobromine	2.2
	Caffeine	0.1
Fibre		4.3
Moisture		5.1

Bournville Cocoa contains over 80 per cent. of readily digestible material and has a food value of 2.126 calories per lb. Analysis of the mineral salts shows that they contain many valuable elements including :—

Phosphorus as P_2O_5	1.58 per cent.
Calcium as CaO	0.12 per cent.
Iron	68 parts per million

A sample supplied from stock, prepared according to the manufacturer's recommendations, produced a beverage which fully justified the claims that this is a highly nutritive and pleasant product.

AMPLIVOX HEARING AID

This new electrical hearing aid is claimed to give an amplification of sounds over a wide range of frequency and also to amplify uniformly all sounds whatever their intensity and without any time lag. When tested by a subject with normal hearing the instrument certainly appeared to give clear results with a wide range and it was particularly noticeable that the machine picked up whispering sounds at a long distance. The standard model is run from an accumulator giving sixty hours actual use for each recharge and a dry battery lasting four to six months. A very small model is also manufactured with an accumulator giving twenty hours actual use. Amplivox High Fidelity Deaf Aids are obtainable from Amplivox, Ltd., 106, George Street, Portman Square, London, W.1.